THE SEA-MANS KALENDER

OR,

An Ephemerides of the Sunne, Moone, and certaine of the most notable fixed Starres.

AS ALSO,

A Table of the *Longitude* and *Latitude*, of all the most eminent Places of the World, very exactly Calculated *by* JOHN TAP.

The Twentieth Impression, newly Corrected and inlarged, with many Additions, *viz.*

Tables of the *Sunnes* equall Motions, and finding of the Sunnes true Place.

***New exact Tables of the* North-Starre.**

New Tables of 77 of the Principall fixed *Starres*, their time of comming upon the *Meridian* every day, with their right *Ascension* and *Declination*, &c.

Also a Discovery of finding the long hidden Secret of *Longitude*.

By HENRY BOND, *Teacher of the Mathematickes at the* Bulwark-gate *neere the* Tower.

LONDON,
Printed by T. FORCET for GEORGE HURLOCK, and are to bee sold at his Shop at St. *Magnus*-corner. 1648.

BRITISH MUSEUM

TO THE COVRTEOVS *Readers Health.*

GEntle and indifferent Readers, whose judgements are not so Sophistically mixed with humorous conceits and quipping Quidities (as many are now adayes) who are apter with their turbulent Tongues to condemne all things, then with insensible judgements to amend any thing: As for them or any such carping Zoylists I am indifferently perswaded to set as lightly by their partiall and injudiciall censures, as they are farre from having a good opinion of ought but what is agreeable to their own phantasticall fictions: Only to them that are of more plausible Spirits and graver Iudgments, who (for the most part in reading) applaud that which is good, and passe over with silence that which is not hurtfull, without scoffing the Worke, or deriding the Author; and to those that have small understanding, are desirous of more knowledge in the *Art of Navigation*, and other Mathematicall studies: To the one I commit the censuring of my Worke, and to the other the profit of my Labours: knowing, that the wise will rather winke at small faults, then rashly reprove that which may profit others, though not pleasure themselves. And though (as I say) the curious and expert Mariners find nothing herein contained which may satisfie their expectation, yet I hope they will judge fa-

vourably of my intentions, and with patience passe it over for affection to the Art it self, wishing charitably that my skill were answerable to my will. As for the meaner sort, whose Experience have not been fitted with Arts rudiment, nor their judgements fined with demonstratives illustrations in the Mathematicall Sciences, but onely are now (as it were) setting themselves with willing minds to learn what before they wanted, I make no question, but as by these following *Tables* and *Propositions* they may reape profit, so accordingly, in yeelding friendly censures upon me and my Workes they shall answer my expectation, with a full recompence of my passed Labours: Further I have added hereunto for the better confirmation of my love unto the Practicers in this Art; I meane, such as are not acquainted with the *Doctrine of Triangles*, the explanation of Mr. *Ralph Handsons* five Nauticall Diagrams in his five severall Cases for the finding of the Sunnes *Azimuth*, by him wrought by the *Canon of Triangles* in *Pitiscus*, and here amplified only to the abridged Table of *Sines*, toward the latter end of this Book; further intreating the courteous Readers, to doe me that favour, as to Correct what they shall find amisse, either in the Printers over-sight, or mine own Errour; and I shall not only endeavour the mending of them in the next Impression, but also bee very thankfull for them at any time shall give me notice thereof, resting withall

Your obliged Friend,

JOHN TAP.

The Propositions follow.

1. *For the Sunnes Azimuth, having no Declination.*

ADde the Complement of the *Latitude*: to the complement of the *Almicanter*, which if the totall be more then a Quadrant subtract 90, and set down the Sine of the remainer for the first number. Againe, adde the complement of the *Latitude* and the *Almicanter* and adde the sine thereof to the former, from the one half of that totall subtract your first number or sine, and set down the remainer: Then, as the ½ of the two first numbers added is in proportion to the whole sine, so is the said remainer to the sine of the Sunnes true *Azimuth*.

Example.

Latit. 51 d. 30'. the Complem. 38 d. 30'. } Added makes 108 degrees *Almicant.* 20 deg. complem. 70 deg. 0 m. } 30 minutes, 90 subtracted leaves 18 d. 30 min. whose Sine 3173 is the first number. Againe complement of the *Latit.* 38 deg. 30'. *Almic.* 20 d. added, makes 58 d. 30 m. whose sine 8526 is the second number thole two numbers added makes 11699 the ½ thereof 5849, from which subtract 3173 the first number rests 2676 for the remaine: then say,

As 5849 the ½ of the two first numbers is to 10000 the whole sine, so is 2676, the remaine to the *Azimuth* desired.

Facit, 4575. whose Arch 27 deg. 17 min. is the *Azimuth* from the East Southward.

2. *When the Sunne hath North Declination, the Two Complements being equall to a Quadrant.*

ADde the Complement of *Latitude* with the *Almicanter* onely, and from ½ the Sine thereof, subtract the sine of the Declination, and setting downe the remainer:

As the ½ aforesaid, is to the whole Sine, so is the remainer aforesaid to the Sine of the *Azimuth* desired.

3 *When the Sunne hath North Declination, the two Complements lesse then a Quadrant.*

ADde the Complement of the *Latit.* and the Complement of the *Almicanter*, setting downe the Sine of the Complement thereof,

then adde the *Almicanter* and the complement of the *Latitude*, and from the sine thereof subtract the former, setting downe $\frac{1}{5}$ of the remaine for the first found number: againe, subtract the sine of the first Complement from the sine of the Declination and remaine thereof; againe, subtract from your first found number, and set the remaine thereof down for your second number: and then,

As the first found is to the whole sine, so is the second to the *Azimuth* desired.

4. *When the Sunne hath North Declination, and the two Complements more then a Quadrant.*

ADde the Complement of the *Latitude* and complement of the *Almicanter*, which being more then 90, subtract 90 and set downe the sine of the remainer, then adde the *Almicanter* and complement of the *Latitude*, and set downe the sine thereof, adde both the sines together, and take the $\frac{1}{5}$ thereof for the first found number, then to the sine of the first two complements adde the sine of the Declination, and from that totall subtract the first found and set down the remainer for the second found: and then,

As the first found is to the whole sine, so is the second found to the sine of the *Azimuth* desired.

5. *When the Sunne hath South Declination, and the two Complements more then a Quadrant.*

ADde the two Complements, subtract 90, set downe the sine of the remainer, adde also the *Almicanter* and complement of *Latitude*, adde both their sines and set down $\frac{1}{5}$ of the totall for the first found, then subtract the sine of the Declination to the sine of the remaine of the first two Complements, and that remaine againe from the first found, which last remaine set down and say,

As the first found is to the whole sine, so is the second found to the sine of the *Azimuth* desired.

In the tenth Astronomicall Proposition by the Tables of Sines *you have a generall rule with some Caution, to find the Sunnes* Azimuth *newly added.*

The Sea-mans Kalender.

Certaine Definitions, meet to be understood of those that will practice Navigation.

A Spheare or Globe, is a round figure, made by the turning of halfe a Circle, till it end where it began to be moved; or a massie body inclosed with one platforme or surface; In the middle whereof is a pricke, from which all Lines drawn to the surface are equall.

Center, is the point or prick aforesaid, in the middle of a Spheare, Globe, or other Circle.

Diameter, is a right Line drawne through the Center to the Circumference or surface of a Spheare, or circle to each thereof.

Circumference, is a round Circle equall distant on all sides from the Center thereof.

Surface or Superficies, is the upper part of any thing.

A Degree, is the 360 part of a Circumference of any Circle.

A Minute, is the 60 part of a Degrée, being understood of measure: but in time, a Minute is the 60 part of an houre, or the fourth part of a Degrée, 15 degrées answering to an houre, and 4 minutes to a degrée.

The Pole is a point or prick imagined in the heavens, whereof are two, the North Pole being the Center, to a Circle described by the motion of the North Starre, or the taple of the little Beare: from which point aforesaid is a line imagined to passe through the Center of the earth and passing directly to the opposite part of the heavens, sheweth the South Pole.

The Equinoctiall, is a great Circle imagined in the heavens: also dividing the heavens into two equall parts, and lying just in the middle betwixt the two Poles, being in compasse from West to East, 360 degrées; every degrée of a terrestriall measure, valuing 20 English leagues or 60 miles.

The

The Meridian is a great Circle dividing the Equinoctiall at right angles into two equall parts, passing also through both the Poles and the Zenith: to which Circle the Sunne comming twice every 24 houres, maketh the middle of the day, and the middle of the night.

Note that every place hath a severall Meridian which doe all meet together in the Poles of the World.

Zenith, is a point or pricke in the Heavens right over our heads 9 degrees from the Horizon, as the Pole is 90 degrees from the Equinoctiall.

Nadir, is a point or pricke in the heavens under our feet, opposite to the Zenith.

Horizon, is a great Circle dividing that part of the Heavens which we see, from the other part we see not.

Azimuth, is a great Circle, crossing the Horizon at right angles as the Meridians doe the Equinoctiall, being as many as the Meridians: and as the Meridians concurre and meet together in the Poles of the world, so doe the Azimuthes meet in the Zenith, which is the Pole of the Horizon.

Parallels, are Lines or Circles equally distant in all parts one from another, as all Circles of East and West are paralell to the Equinoctiall.

Almicanteraths, are Circles paralell to the Horizon, being also Circles of Altitude or Elevation, being that the Altitude of the Sunne, Moone, or Starres above the Horizon are discribed thereby: which Almicanters doe crosse the Azimuths, as the Paralels or Circles of East or West doe crosse the Meridians.

The Tropicks are two lesser Circles paralell to the Equinoctiall limitting the bounds of the Zodiack or the greatest declination of the Sunne on each side of the Equinoctiall. The Tropick of Cancer Northward, and the Tropicke of Capricorne Southward, whose distance from the said Equinoctiall are 23 deg. and 31 min.

The Zodiack, is a great Circle crossing the Equinoctiall in two opposite places thereof and swarving by as-wise there-from towards either of the Poles, touching the Tropick of Cancer on the North

North part, and the Tropick of Capricorn on the South part thereof. In the Zodiack are 12 Signes: viz. Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagitarius, Capricorne, Aquarius, Pisces; every Signe being 30 Degrées in length, and 12 in bredth: through which Signes the Sun passing describeth a Yeare, and the Mone passing likewise through the same makes a Moneth: The 12 degrées that the Zodiack hath in bredth, are allowed for the Latitude of the Planets.

Ecliptick, is a Circle lying just in the middle of the Zodiack, out of which the Sun never goeth, but the Mone and other Planets are sometime on the one side, and sometime on the other side thereof, in which the head and tayle of the Dragon also is.

The head and tayle of the Dragon, are two opposite points in the Ecliptick line of the Zodiack, which goeth backward through the 12 Signes in 19 yeares: And when it happeth, that the Sun and Mone are in conjunction, in that place of the Ecliptick where the head or tayle of the Dragon is, then is the Sun eclipsed, and being in the Oppositions, the Mone being in either of the said points, the Mone shall be Eclipsed.

The Circle Artick, is a Circle which incloseth all those Starres which doe never rise or set in any Latitude, but are alwayes above the Horizon where the North pole is raised: the like is understood of the Circle Antartick, where the South pole is raised.

The Polar Circles, are two little circles distant from the Poles of the world, so much as is the greatest Declination of the Zodiack from the Equinoctiall: in which Polar circles are the Poles of the Zodiack.

Colures, are two great Circles passing through both the Poles, crossing one another in the said Poles at right angles, and dividing the Equinoctiall and the Zodiack into foure equall parts, making thereby the 4 Seasons of the yeare. The one Colure passing through the Equinoctiall points of Aries and Libra, sheweth the beginning of the Spring-time and Autumne, which two times the Dayes and nights are equall. The other Colure passing through the two Tropicall points of Cancer and Capricorne, sheweth the beginning of the Summer and Winter: at which two times the dayes and nights are longest and shortest.

Altitude, in the Heavens, is the height of any thing above the Horizon towards the Zenith.

Latitude, is the wideneſſe and diſtance of the Planets or Starres from the Ecliptick, either Northward or Southward. Alſo Latitude is the diſtance of the Zenith of any place from the Equinoctiall toward either of the Poles, which is alwayes equall to the height of the Poles of the ſame place.

Longitude, is length, and in the heavens it is underſtood the diſtance of any Starre or Planet, from the beginning of Aries to the place of the ſaid Planet or Starre, or from the beginning of any ſigne to a certaine other part or degree of the ſame ſigne: Otherwiſe Longitude in the earth, is the diſtance of the Meridian of any place from the Meridian which palleth over the Iſles of Azores, where the beginning of Longitude is ſaid to be. Longitude is counted upon the Equinoctiall, and Latitude upon the Meridian.

Declination, is the declining or diſtance of the Sun, Moone or Starres from the Equinoctiall and is ſaid to be North or South, according to the Pole towards which it leaneth.

Amplitude, is the diſtance of the riſing and ſetting of the Sun, Moone or Starres, from the true Eaſt or Weſt point of the Compaſſe upon the Horizon.

Aſcenſion, is the riſing of any Star, or of any portion of the Ecliptick above the Horizon. Right Aſcenſion, is the number of degrees and min. of the Equinoctiall, which commeth to the Meridian with the Sun, Moone, Starre, or any part of the Ecliptick.

Oblique Aſcenſion, is the number of Degrees of the Equinoctiall, which commeth to the Horizon with any Starre or any portion of the Ecliptick: in which ſort is Oblique Deſcenſion alſo.

Aſcenſionall Difference, is onely the remainer, the one being ſubtracted or taken from the other.

The Golden number or Prime, is the time of 19 yeares: in which time the Sun and Moone make all variety of their Conjunctions, Oppoſitions, and other Aſpects.

Epact, is the 11 dayes and 6 houres, which are added to the yeare of the Moone, being 354 dayes, to make it equall with the yeare of the Sun, which conſiſteth of 365 dayes ¼. By the Prime is found out the Epact: and by the Epact, is found out the age of the Moone.

The

The Circle of the Sun, is the number of 28, because that in 28 yeares all the variety of Dominicall or Sunday Letters, and Leap-yeares are expired, being that at the 29th yeare the Circle doth begin againe: The use of which number is to find out the Dominicall Letter for any yeare past, present, or to come: Where note, that there is but 7 Letters which serve for Sunday letters, viz. A, B, C, D, E, F, G. And albeit that in the dayes of the weeke, they proceed according to their naturall order of the Alphabet, yet in the yeares they goe backward: as if G, be for one yeare, F shall be for the next: and when it is Leap-yeare (which is every fourth yeare) then is there two Letters for the yeare, the first serving from the 1. of January till St. Mathias Day, which is then the 25 of February, and then the other letter takes place, and serves till the yeare end.

To find which number of the Suns circle, and consequently the Dominicall letter for the yeare proposed to the yeare of our Lord adde 9. that totall divide by 28, and that which remaines, is the Circle of the Sun for that yeare. Then to know the Dominicall letter: Note that the 28 yeare the Dominicall letter is A, and is the third from the Leap-yeare; therefore the first to begin withall againe, is G F, because it is another Leap-yeare: and so counting the 7 Letters backward, and every fourth yeare counting two letters: That letter upon which the number of the Suns circle ends shall be the Sunday letter for the yeare proposed.

As for Example.

The yeare 1647. adding 9 thereto, it makes 1656: that being divided by 28, the Remainer is 4, the Circle of the Sunne: then counting 4 Letters backward according to order, till I have counted foure places, beginning with G F, thus: 1. G F, 2. E, 3. D &c. I find the fourth place ends upon C, which I conclude to be the Dominicall letter for the yeare aforesaid: And it is the 3d. yeare after Leap-yeare.

And here is to be noted, that the Prime and Dominicall letter, changes the 1. day of January, and the Epact the 1 day of March.

To find out the Prime.

Divide the yeare of our Lord by 19, and to that which remaineth after the Division, adde 1: The Product is the Prime number for all that yeare.

As for Example.

I would know the Prime for the yeare 1645, divide 1645 by 19 and you shall have in the Quotient 86, and after the division there rests 11, unto which if you adde 1, it makes 12, which is the Prime for that yeare 1645.

To find out the Epact.

Adde to the Epact of the yeare past 11, and if it passe 30, take away 30, and the Product is the Epact for all that yeare: but otherwise, which is the better way: Imagine three places upon your hand, which for example let it be the three joynts of your fingers, and call or name the first joynt 10, the second 20, the third 30, then count the Prime number upon the three joynts aforesaid, and going over them untill you come to the end of the said Prime number, marke upon which your Prime ends, and adding the number of the joynt with the Prime, if they come not to 30, that shall be the Epact for all the yeare. If they passe 30, take away 30, and the remainer is the Epact, if it be just 30, then is the Epact equall to the Prime.

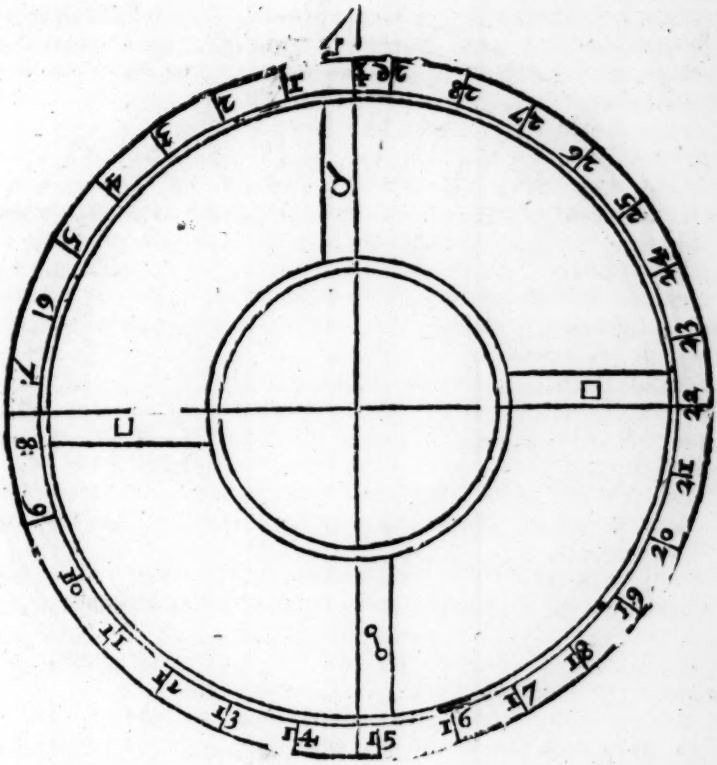
As for Example.

The yeare 1645, the Prime is 12, and imagining the first joynt of my finger to be 10, the second 20, the third 30, I count upon the three joynts 12, the Prime number, viz. upon the first joynt I tell 1, on the second 2, on the third 3. Againe, on the first 4, the second 5, and so to 12, which is the Prime, ending upon the third joynt, which I call 30; therefore adding 30, the number of the third joynt makes 12 for the Epact of the yeare 1645 aforesaid.

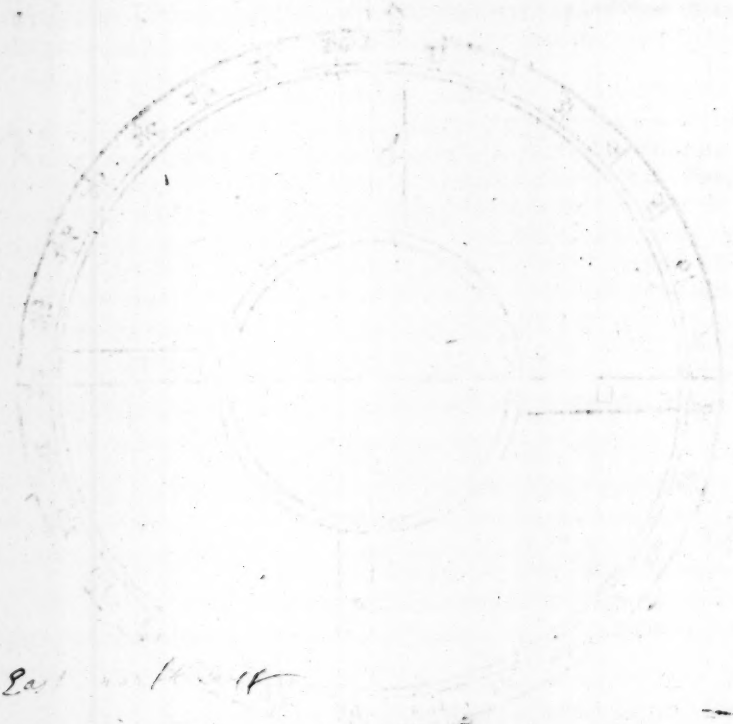
To know the Moones age.

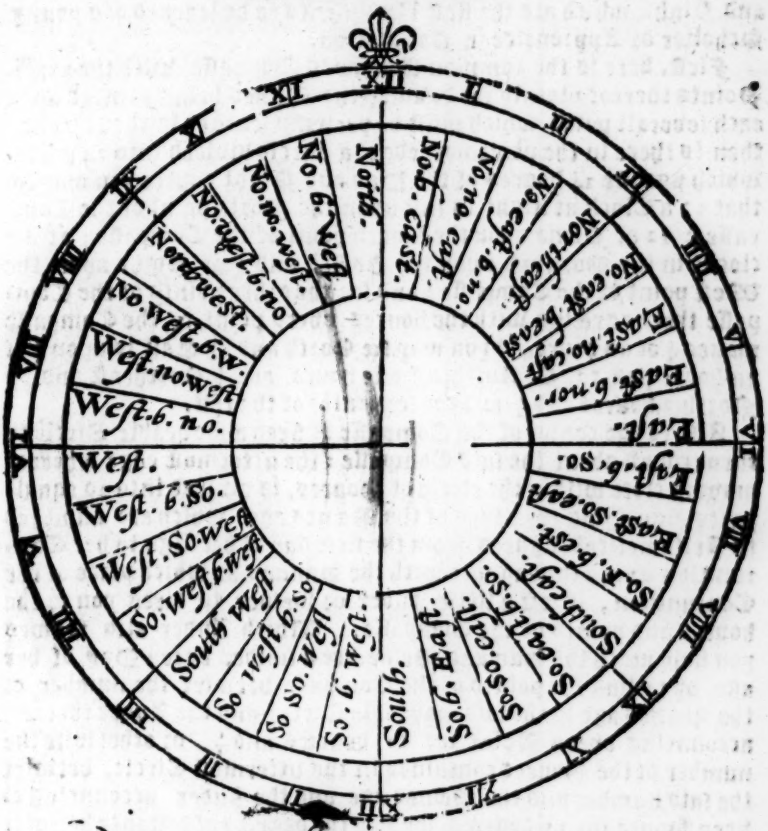
Adde to the day of the Moneth the Epact, and so many dayes of March as are Moneths from March, to the Moneth you are in, including both Moneths, and if they come not to 30, so much is the Moones age: But if they passe 30, take away 30, and the overplus is the Moones age.

This is when the Moneth hath 31 dayes, but if the Moneth hath but 30 dayes, you must take away but 29, and the rest is the Age aforesaid, for in those Moneths that have 31 dayes, the Conjunction is the 30 day of her Age, and those Moneths that have but 30 dayes, the Conjunction is the 29 day of her Age.



The foure white quarters within the utmoſt Circle are to be cut out, and then the Figure to be placed upon this Compaſſe following.





A Declaration of the former Instrument.

This Instrument gives you a plaine and easie Order, for the shifting of the Sunne and Moone for every day of her Age: and also it is a ready and most necessary reckoning of the Tides, whereby also is shewne the common order to bring thereby the 32 Points of the Mariners Compasse to 24 Houres of the Day and

and Night, which are the first Rudiments to be learned of a young Scholler or Apprentice in Navigation.

First, here is the common Mariners Compasse, with the xxxij. Points thereof plainly set downe, the Names being printed upon each severall point, which must be perfectly learned without booke: then is there in the uttermost edge, a Circle divided into 24 parts, which signifie 24 houres of the Day and Night, where you may see that 12 a Clock at night is just upon the North point of the Compasse: 12 at Noone upon the South point of the Compasse; at 6 a clocke in the Morning upon the East: and 6 at Night upon the West point of the Compasse: and for the other points of the Compasse there agreeing with the houres, every point of the Compasse makes ½ of an houre, as you may see North and by East is upon ½ of an houre past 12, N. Northeast one houre, and ½ Northeast and by North 2 houres and ½, and consequently of the rest.

Also to the center of the Compasse is fixed a moveable Circle to turne round about the said Compasse: the uttermost edge whereof moving close within the circle of Houres, is divided into 29 equall parts, signifying the dayes of the Moones age, which are numbred in Arithmeticall figures, from the first day of her Age, to her Conjunction or meeting againe with the Sunne: at which place of her Conjunction, is left a little Inder or shewer, to direct you to the houres and points of the Compasse: Which Inder also shewes you how much the Sun and Moone are asunder every Day of her age, by telling the points of the Compasse betwixt the number of the Moones age in the said moveable Circle and the Inder thereof, accounting every Point for 11 degrees and ½, or otherwise the number of the Houres contained in the uttermost Circle, betwixt the said number and the Moones age and the Inder, accounting every Houre for 15 degrees, shewes the degrees of distance betwixt the Sunne and the Moone.

Now to keepe reckoning of the Tides thereby, you must know by the Table hereafter set for that purpose how it flowes: that is to say, what Moone makes full Sea or high water at that place where you would know the time of the Tide or high water for the day proposed: which knowne, you must also by the former Propositions, or else by the Kalender following, know the Moones age: then

then ſeeking out the number of the Moones age in the moveable Circle, place the ſaid number of the Moones age upon the point of the Compaſſe which makes full Sea upon the change day at your place deſired, and ſtaying it there, the Inder which is in the ſaid moveable Circle, points you directly to the point of the Compaſſe that the Sun muſt be upon when it ſhall be high water the foreſaid day in the deſired place, and alſo, in the uttermoſt fixed Circle it ſhewes the houre of the day which you deſire.

As for Example.

The firſt of January, 1645. I deſire all this aforeſaid: Firſt, for the Moones age, becauſe that the Epact changeth not till the firſt of March, I adde the Epact of the laſt yeare, before which is 12, and the day of the Moneth 1, is 13. Then January being the 11 Moneth from March, 11 added thereto, makes 24 for the Moones age the firſt of January 1645.

Againe, to know how much the Sunne and Moone are aſunder, the Moone being 7 dayes old, I ſeeke in the moveable Circle for the Moones age, which being 7. I place 7 upon a certaine point of the Compaſſe. which for example is here Weſt, and the Inder ſhewes the North and by Weſt, and ½ to the Northward, which is 7 points and ½. That multiplied by 11 ½. the number of degrees that belong to a point of the Compaſſe, makes 87 degrees 12 min. for the diſtance betwixt the Sunne and the Moone, and in houres it ſhewes 5½, which multiplyed by 15 yeelds the like, being very neere ⅛ of the Zodiack.

Then for the Tides at London-bridge, it flowes Southweſt and Northeaſt, or is high water at 3 a clock on the Change day. therefore when the Moone is 7 dayes old, I place 7 the Moones age upon the point Southweſt at 3 a clock, and ſtaying the moveable rundle there, I ſee that the Inder ſhewes almoſt Northweſt, which is 40 minutes neereſt hand, or neere 3 quarters of an houre paſt 8 of the clocke, at which time it ſhall be high water at London-bridge, the Moone being 7 dayes old.

Againe, at Harwich where it flowes South and by Eaſt, the Moone 10 dayes old, I lay 10 (the Moones age upon the point of the Compaſſe South and by Eaſt) and then the Inder ſhewes the point Weſt Northweſt of the Compaſſe, and in the Circle of

houres ½ of an houre paſt 6, which is the time of the full Sea at Harwich, the Moone being 10 dayes old.

But if you want a Table or Inſtrument to worke the account of the Tides, you may do it by memory, multiplying the Moones age by 4, and divide the Product by 5, and to the Quotient adde for every unity which remaines upon your diviſion 12 min. that totall adde to the houre that it makes full Sea on upon the Change day, the Product ſhall be your deſired number, as in the firſt Example.

The Moone 7 dayes old, and the High water at London on the Change day at 3 of the clocke, I multiply 7 (the Moones age) by 4, makes 28, that divided by 5, the quotient is 5, and 3 remaines upon the diviſion, which 3 being ſo many times 12 min. makes 36 min. and added to 5 in the Quotient, makes 5 houres 36 min. that added to 3, the houres of full ſea upon the Change day, makes 8 of the clocke and 36 min. as afore ſaid.

An Exact way for the Tides.

HOw neceſſary (nay of what neceſſity) the true account of the Tydes is, every man that taketh Charge (at leaſt he that taketh care of his charge) doth very well know; and yet no one thing (by moſt men) more groſly ſlubberd over then this; for there is onely a generall Rule uſed, as if all places were under the North Pole, where the Equinoctiall is the Horizon, and that the departure of the Moone from the Sunne were at all times equall; in both which reſpects, the Rule is moſt groſely abuſed. For in North Latitude, 51 degrees 30 min. the Moone being in Cancer, and having 5 deg. 0 min. North Latitude it is 30 min. paſt 10 of the clocke before the Moone will be Southeaſt, and at 30 minutes paſt one of the clocke the Moone will be Southweſt, and for any point neerer to the Eaſt or Weſt, the errour will be greater; again, if it be in Latitude 30, or in Latitude 40. it will be farre greater.

The miſ-account of which time from a High water, may caſt away ſhip and goods in going into a Harborough where water is ſcarce, where it is to be looked unto and reſpected. To correct this Error, I will heere propound a very exact, eaſie and ſpeedy way to account the Tides (in any Latitude whatſoever) which is by the Celeſtiall Globe:

First,

First, set the Pole and Zenith to the Latitude of the place, and bring the degree in the Ecliptick of the Sunnes place for the day given to the Meridian, and stay the Globe there untill you set the Index of the houre circle to 12 a clocke, then by an Ephemerides, or by an Almanack, find the degree of the Moones place in the Ecliptick for the time of the Day (which you may doe by the difference betweene the place the Moone past, and the next Moone following) next bring the Quadrant of altitude to the point of the Compasse in the Horizon (that the Moone must bee upon to make a high water) and stay it there; Lastly, turn the Globe untill the degree of the Moones place in the Ecliptick, do cut the former edge of the Quadrant of altitude, and in the houre circle you shall see the time of High-water. The neglect of the Moones Latitude is of no great moment in the matter. But you must be carefull that your Globe be true, for this and all other ules; and therefore take heed of dealing upon Sale ware to save money.

Example.

The 14 day of November, 1638. at night, I desire to know the time of high-water at London, the Sunnes place is 2 degrees 16 min. in Sagitarius, the Moones place about 6 of the clocke at night, is about 13 degrees 0 min. in Cancer. The time of high-water by the Globe is not 3 quarters past 4 a clocke, and by the common Rule it will be 6, which is above one houre and a quarter false. The Moone will be 18 dayes, and 19 or 20 houres old at that time.

The Government of the Planets.

Divers Writers have disagreed, concerning the Planetary houres; some making the houres of the Planets equall with the houres of the clockes, and so continuing their Regiment orderly with the other common houres. Some againe beginning the said Planetary houres at Noone, some at Midnight, and some againe at Sun-rising: Which indeed for the time of the beginning of the accompt is best, and for the differences of the equality and inequality betweene the Planetary houres, and the common houres of the clockes. Gemma Frisius agreeing with the best

Astronomers, saith, That as the dayes and nights doe increase or decrease, so must the Planetary houres be longer or shorter accordingly, nevertheless so that there shall be 24 Planetary houres in the Day and Night, aswell as of other houres: but that if the day consist of more then 12 houres, then proportionably the Planetary houres to consist of more then 60 minutes: And if the Day be lesse then 12 houres, then the Planetary houres are to be lesse then 60 min: and if the day be just 12 houres, then the Planetary houres are equall to the houres of the clocks and not otherwise. The like is to be understood in the nights, and to make an equality of the Planetary houres to them of the clocks, being that how long soeber the day is, yet there must be but 12 Planetary houres: and how short soever the day is, there must (nevertheless) be 12 Planetary houres, and so of the night: by which you see, that the Planetary houres are sometimes greater and sometimes lesser then the common houres of the clocks, which alwayes consist just of 60 minutes: therefore if you divide the day into 12 equall parts, one of those parts shall be the quantity of a planetary houre, which you may do thus: Multiply the houres of the day into minutes by 60, and if there be any odde minutes, adde them to the Product, the totall being divided by 12. the quotient shewes the number of min. contained in an unequall or Planetary houre.

And againe, if at any houre of the Day or Night you know not what Planetary houre it is, that is to say, how many Planets have ruled since the beginning of the Day or Night proposed: multiply the number of the houres past from Sunne rising by 60, and divide the Product by the number of the minutes contayned in an unequall or planetary houre; the Quotient will shew you how many houres and minutes of the Planets are past from the Sunne rising (if it be in the Day) or from Sunne setting if it be in the night: which knowne, enter the Table following, to know what Planet rules the day and houre proposed, loking for the houre desired in that Collume which is right under the day proposed: those Planets which are governours of the said houres in the day time being placed on that side next the left hand, and the Governours of the night on the right hand.

Example.

Example.

The 17 day of May being Sunday at 9 of the clock in the morning, I would know what Planet rules? First in the following Kalender, I find that the 17.th of May, the day is 16 houres long; therefore I multiply 16 houres by 60 minuts, and the Product is 960, that divided by 12, brings in the Quotient 80 minutes for the length of a Planetary houre at that time: then from 4 of the clock (the time of the Sunnes rising) till 9 a clock, the houre proposed is 5 houres, which multiplyed by 60, brings 300, that divided by 80, (the length of a Planetary houre) brings in the Quotient 3 houres and 3 quarters: so I conclude, that at 9 of the clocke, 3 Planets have past their Regiment, and the 4.th hath ruled 3 quarters of his houre; Therefore under the title Sunday in the top of the Table, I looke for 4, toward the foot of the said Table, against which on the left hand is placed Luna; therefore I say, that the 17 day of May being Sunday at 9 of the clocke in the morning, Luna shall have raigned 3 quarters of her houre.

Governors of the Day,	Sunday,		Munday,		Tuesday,		Wednesday,		Thursday,		Friday,		Saturday,		Governors of the Night.
Sol,	1	12	9		0	10	0	11	Jupiter.
Venus,	2	0	10		0	11	1	12	Mars.
Mercury,	3	0	11		1	12	2	0	Sol.
Luna,	4	1	12		2	0	3	0	Venus.
Saturne,	5	2	0		3	0	4	1	Mercury.
Jupiter,	6	3	0		4	1	5	2	Luna.
Mars.	7	4	1		5	2	6	3	Saturne.
Sol,	8	5	2		6	3	7	4	Jupiter.
Venus,	9	6	3		7	4	8	5	Mars.
Mercury,	10	7	4		8	5	9	6	Sol.
Luna,	11	8	5		9	6	10	7	Venus.
Saturne,	12	9	6		10	7	11	8	Mercury.
Jupiter,	0	10	7		11	8	12	9	Luna.
Mars.	0	11	8		12	9	0	10	Saturne.

A Rutter for the Courses round about *Ireland*, from Cape to Cape, and what Tides it makes in every Harbour, and how many Leagues it is from Harbour to Harbour.

IMprimis, from Cape-cleere to the Mison-head is 7. Leagues, and lyeth West and by North, and East and by South, you shall find a Haven Northwest from Cape-cleere called Crooke haven, and it floweth there East Northeast, and West Southwest; you must go west to enter into it.

From the Mison to the Durzib, is 7 leagues, and lyeth West northwest, and east southeast.

Beare Haven lyeth from the Mison-head, North Northwest 3 leagues and a halfe, you must go Northwest into the haven, it floweth East Northeast, and W. Southwest: If you will anchor betwéene the Durzib and the maine Land, you must goe abord the Iland, for the East side is not sound.

The thrée Ilands that be off the point of the Dourzies, which is called the Bull, the Cow, and the Calfe, they be sound; and you may go within them or elfe betwéen them, for there is no danger but what you sée.

Dourzies and Blaskey, lye north and by West, and South and by East, and there is betwixt them 5 leagues, and Skellocks is betwéen both, and it floweth Northeast and Southwest.

Northeast of the great Skellocks, 2 leagues off, you shall find the entry of Vallens, you must runne East Southeast to enter in, it floweth E. Northeast; you must borrow of the Iland to enter in, for the point on the Easter side is long.

North northeast off the great Skellocks 6 leagues off, you shall find the Haven of Ventry which is a good Road: It floweth East Northeast.

North-

Northeast by North off the great Skellocks 7 leagues, you shall find the haven of Dinggell, and without the haven is a Rock called the Croo, which is found on both sides: The Rock doth not cover but on a Spring-tide: You must run Northwest and by west into the haven, it floweth E. northeast, and W. southwest.

The Ventry and the Sound of Begne, lyeth South by East, and North by west 3 leagues, and when you are past into the sound of Begue, you must lye East and by north into the Road against a red Cliff which is on the South side.

Southeast off the Sound of Blaskey, a fire leagues off, you shall find a good harbour named Begue, which is to the Northeast off Valence: The said haven hath two entries, but the West side is the best: You must take heed of a sunke Rock that is on the Islands side, which you must leave on your Larboard side going in, and it floweth E. northeast, and W. southwest.

You shall understand, that the said Sound of Blaskey, lyeth S. east and northwest, but you must take heed of a sholde that is on the East side athwart the Sezebras.

From Blaskey to Smirrick is 3 leagues, and if you enter into the haven you must goe Southwest into it: It floweth East northeast, and West southwest.

There is a Hill to the Eastward of Smerrick, which is called Sinbaandon, goe from Smerrick East northeast, and you shall goe with Lopus-head, which maketh entry of the River of Limeric, on the Northside: there is from the one to the other 10 leagues.

Smerrick and the head of the Kerry, lye East Northeast and West southwest, 7 leagues asunder, and there is within the Bay three Islands called Saline.

From Lawpshead to the Seaties, is 7 leagues they lye E. N. E. and W. S. W. and if you enter into the River, take heed of a sholde halfe way between Lawpshead and an Island called Scatrick, which you must leave on the Southside, and to the Eastwards of that Island is a good road: It floweth E. N. East, and W. southwest.

From Scatrick to Quoyne, is 5 leagues, you must goe East, and you shall find two Islands, they be flat Islands, goe to the Northwards hard aboard them, and from thence run E. North-

east,

east, and you shall find a Rock called the Bieffe, go hard aboord the Southside of the said Rock called the Bieffe. And when you are at the said Rock you must row Southeast, and you shall find another Rock called the small Biefte, then go with the Iland of the entry of Dorsey, and borrow aboord the Iland as neere as you can, for feare of the Banke going into the Haven, and you must moore at the Castle by foure Cables, for there goeth a great Tide, it floweth East northeast, and west southwest.

The Sound of Blaskey, and the Ilands of Arrin, lyeth North Northeast, and South Southwest, and there is betweene them 16 leagues: the Ilands lye East and west, and makes the entrance of Galloway and of the other Ilands: there is one which is naught; but the West sound is good, and the next sound to it is good, which is called the little sound, but the sound comming from the East is naught, but the next comming to the Black-shore from the East is part lyeth good, but you must put the two partitions to the Iland, for it is dangerous: You must understand that there is one Iland in the course way, betwixt Lawpshed and the entry of Galloway, that hath a great Ranie, a league and a halfe off the maine land.

If you go before the Town of Galloway, goe aboord the Black-shore, and bring the Black-shore Southeast of you: then go Northeast, and you shall seteh the Iland called Motton Iland, and there is betweene them both three leagues: You must not trust to the North shore, for there is a Shoald halfe way to the Black-shore and the Iland of Motton, is thwart of two white points, which is on the Northside.

The said shoald is upon the West Southwest side of the said Iland of Motton, a league and a halfe off, at a Spring tyde, then shall you see it dry, and it floweth at the said Iland, East northeast and West southwest.

The Sound of St. Gregory, and the Rode of Galue, lyeth East northeast, and W. southwest, and there is betwixt them 8 leagues.

The Sound of St. Gregory and Silvis-head, lye Southeast and northwest, and the distance betwixt them is 9 leagues.

Slinshed and Sarke, lyeth North by west, distant 15 leagues.

Black-rocke, is an Iland which is West of Kill-head, a leagus off

off the Cape: and the said Black-Rocke and the Stags lyeth North-east and by north, and are distant 12 leagues.

From the said Black-rocke, run North, and you shall find the Ilands of East Eves, and there is betwæn them 2 leagues.

South southwest off the Stags, there is a Haven called Broad-haven, from the Haven to the Stags, is two leagues: the Stags is a Cape that maketh the entry of the River of Raken they lye East and west, and are distant 8 leagues: the Staggs and the Cape of Tellen, lye northeast and southwest, and are distant 15 leagues.

Betwixt the Stags and the Cape of Tellen, in the Bay, is the Haven of Moy, the Haven of Portway, the Haven of Slego, the Haven of Balecshannen, the Haven of Dongall, the Haven of Kelkeg, and the Haven of Tellen.

The Cape of Tellen, and the Iland of Arron, lye North northeast, and South southwest, and are distant 7 leagues.

The Iland of Raghlenburne, and Tellen, lye Southwest and Northeast and are distant two leagues.

The Iland of Raghlenburne, and the Iland of Torre, lye North northeast, and South Southwest, and are distant 14 leagues.

To the Eastward of Torre, is a Cape called Horne-head, and are distant 2 leagues: Southeast of Horne-head is a Haven called Sheepe-haven, it floweth East and west, but you shall have in the Bay a good Road for all winds: the said Haven is a broad Haven, and is two leagues from the Cape.

Horne-head and the entry of Loughsoyle, lye East northeast and west southwest, and are distant 6 leagues.

The entry of Loughsoyle, and the Iland of Enersterhould, lyeth Northeast and Southwest, and are distant 5 leagues.

The Iland of Torre and the Iland of Enersterhould lyeth East and by North, and West and by South, and are distant 9 leagues.

The entry of Loughsoyle, and Enersterhould, lye Southeast and Northwest, and are distant 5 leagues.

The Iles of Enersterhould, and Skirris Portrush, lye East Southeast, and West Northwest, and are distant 10 leagues.

You must understand, that the River of Loughsoyle, lyeth

from Skirris Portrush, West south west, and East northeast, and there is betwirt them the River of the Band: there is betwéne Portrush and Loughfoile 5 leagues: There is in the entry of Loughfoile, a Sand which is called the Tonnes which is dangerous for any Ship of charge; also there is a channell on the East syde of the Tonnes hard aboard the shore, but you must have your tide: It floweth East by south, and West by north: Skerris Portrush and it lyeth South and north, distant 12 leagues.

Skerris Portrush and the Ilands of the Raghlins, lye Northeast and by east, and Southwest by west, and are distant 5 leagues: it floweth in Skerris East southeast, and W. northwest, the flood commeth from the Eastward.

Off the Raghlins is a Cape called the faire Forland, and betwixt them is a league and a halfe, the faire Forland and the Knee lyeth South southeast, and North northwest, and are distant 9 leagues.

The faire Forland and Loughrian in Scotland, lye East southeast, and West northwest, distant 15 leagues.

There is betwixt the Knee and Carick-Vergus, 5 leagues.

The point of Loughrian and the Ilands of Commoras, off Scotland lye North and south, you must passe by Ellise and by the Haven of Lambach a sunder 7 leagues.

The point of Loughrian and Compnam Iles, lyeth Northeast and southwest.

The Knee and the Rock of the Maydens lye Northeast by N.

The Knee and Ellse in Scotland, lye Northeast by east, distant 10 leagues.

Loughrian in Scotland and the Mould of Galue, lyeth South southeast, and North and northwest, and are distant 7 leagues.

The Mould of Galue and the Calf of Man, lye South southeast and North northwest, and are distant 10 leagues.

The Compnam Iles and the road Carrick-Vergus, lye East and west, and are distant 14 leagues: it floweth in the Sound east southeast, and west northwest.

Compnam Iles and the point of the Moulens, lye South southeast, and North northwest, distant 7 leagues.

The

The point of the Moulens and the Ile of Lambay, lye South southwest, and North northeast, and are distant 21 leagues.

Lambay and Carlingford, lye North northwest, and S. southeast, and are distant 18 leagues.

Lambay and the Ile of Dalke, lye South southwest, and North northeast, and are distant 5 leagues.

The banke of Wicio, beginning thwart of the Forth of Dublin, and continues to the Ile of Tosker, they lye North by west, and South by east, and they lye in length 24 leagues.

Tosker and the point of the Grenord, lye and by north, and west and by south, distant two leagues.

And when you are bound to the Eastward off the Grenord, you must kéep the Mountaine of Washford above the low land, and so you shall goe cléere of all the dangers betwixt you and the shore: And if you close the Mount with the low land, then you shall go with the dangers.

Tosker and the Cape of Canwall, lye South by east, and North by west, 40 leagues.

Tosker and the Salts, lye East northeast, and West southwest, distant 6 leagues.

The Salts and Silly, lye South and north, and are distant 33 leagues.

The Salts and the Tower of Waterford, lye East and west, and are distant 5 leagues.

The Tower of Waterford and the Ile of Ballecutin, lie Southwest and by west, and Northeast by east, but betwéene the Tower of Waterford and Ballecutin, is a haven called Yoghall, and a Sea-bord it, in an Iland called Capell-Ile, and betwéene Capell-Iland and Ballecutin, is 4 leagues.

The Tower of Waterford and Helnick-head, lyeth East and west, distant 3 leagues.

Capell Iland and the Iland of Ballecutin, lie West southwest, and East northeast, and are distant 3 leagues and a halfe.

Ballecutin and Corke Haven, lye West by south, and East by north, and are distant 3 leagues and a halfe.

Oyster Haven and the Old head of Kinsale, lye Southwest and northeast, distant 3 leagues and a halfe.

The Haven of Kinſale lyeth from the Old-head, North northeaſt, and going in, you muſt keepe Bane Caſtle open of the Weſt land.

The Old-head and Cape Cleare, lye Weſt by South, and Eaſt by North, and are diſtant 14 leagues.

Cape Cleare and Silly, lye Eaſt Southeaſt, and Weſt Northweſt, diſtant 50 leagues.

There lyeth from Faſten a Haven called Crocke Haven; and is from it Northweſt, diſtant 4 leagues.

There is a Haven called Scoll Haven, which lyeth from Faſten North and by Weſt, diſtant 5 leagues.

There is a Head-land, halfe way betwixt the Old-head of Kinſale and Bakemore, which is called Kendonetedo, and it lyeth Northweſt by Weſt, from it is a good Haven called Clendor, there is a high Land to the Eaſtward, you muſt goe aboord that high Land, and ſo into the Haven. There is a rainy of Rocks on the Weſt land, that goeth to the Eaſtwards; therefore keep the Eaſt ſide, and when you come in, Anchor before the Caſtle: there lyeth Weſt Northweſt from the ſaid head, a good Haven called Caſtle-haven, 4 leagues from it, and if you come out into the Sea and meete with the Staggs, you muſt goe Northeaſt into Caſtle-haven, and in the entry there is an Iland which you muſt leave on the Eaſt ſide of you, and another flat Iland which you muſt leave on the Weſt ſide of you: you may goe dry at low water from it to the maine, for it is very nigh to the Weſt land, but be bold on the Eaſter Iland, and go right with a Chappell that lyeth on the Eaſt ſide of the maine Land, and when you are thwart of the Chappell, you ſhall ſee a Caſtle on the Weſt ſide, and thwart of the Caſtle you may enter in 12 fatham, it is from the Staggs three and a halfe leagues.

You muſt underſtand, that the flood hath from Dourze to the Old-head of Kinſale North northeaſt, and the Ebbe to the contrary, and from the Old-head to the Tower of Waterford, Northeaſt and Southweſt, and from the Dourze to the Northwards, North northeaſt and South ſouthweſt.

If you will goe in betwixt the Caſh and the North-head of the grounds

of

grounds into Dalky, you must bring a round hill that stands like a Sugar-loafe N. Northwest, and then you shall have 10 fatham: It floweth southeast alongst the Channell and the barre of Poulbacke, there is eight foot water upon it at low water, and thrée fatham at full Sea: your Barre lyeth South and North, and you shall have in the road of Poulbacke, 14 foot at low water.

To sayle from Dalky to the road of Poulbacke, you must kéepe a small Rocke open, a hand-spicke length, and when you come to the Barre, you must lye West Southwest up into the road within the Beacon, then must you Anchor in foure fatham at high-water, for there be two Hills on the Southside, a high hill and a low round hill: bring them both in one, and then you be in the best of the Road. A South southeast Moone, makes a full Sea.

A Note for going into *Milford.*

If you come for Milford, you must leave all the Ilands to the Westwards, and when you have the Grasham North Northwest, then the Haven beareth Northeast by North, and when you come into Dall Road, you may ride in thrée fatham and a halfe at low water, it floweth East by North.

Milford goeth in close under Cowein and Scabon, to the Eastward, and when you come open of Milford, you shall sée an Iland like the Mawstone, which lyeth on the East side, and in Dall Road you may ride for all winds, the Small lyeth from the Grasham thrée leagues, and betwixt them lyeth a ledge of Rockes, which is dry at low water: it lyeth midway, and it is very dangerous comming betwéen them.

A generall and Compendious Tide-table,

shewing what Moone makes full Sea or high water in all these Places following.

Full Sea on the Coasts of *Zutphen*, *Friezland*, *Holland*, *Zealand*, and *Norway*.

At the Inlandish Iles before the Rivers of Hever, Fider, and Elve. South and N.

At Ancuisen. S. and N.

The Ile of Urke before Delfe-Ile, at Embden, and all the shores of Flanders, S. and N.

Before the Maers deepe, E. and W.

At Hambrow and Antwerpe, E. and W.

Underneath Holy land, W.S.w.

At Egmont and Harlem, Southeall.

In the Bresen and Vourd, W.S.w.

Before the Eaterne and Western entrances of the Emes or River of Embden, before all the Coast of Friezland and and the Fly, E.S.E.

Before the Gheest of Texell, W.S.w.

Upon the Flats of West Friezland, Wyering, and Amsterdam, S.W.

Without the bankes of Flanders, S.W

Dodrecht and Zierick Sea, S.W.

Roterdam, and from Harlem to the River of Maes, S.W.

At Wardhouse, E, and W.

At Brihac, E.S.E.

Cape Gallant. S. by E.

The Bayens of Yotland and Norway, S. and W.

At Corpus Christi Point, S.S.W.

Before the Fen in the Channel at Horne, Edam, Ile of Gore, before the Maes, before Camfer, and Terver, S.S.w.

Before the Willing and all the Coast of Zealand, S.S.w.

North-Cape & Blanebrow, S.w.

Fox-nose and St. Nicolas road, W.S.w.

Full

Full Sea on the Coaſt of *France*, *Spaine*, and *Portugall*.

At Blackneſſe, Armuy, Rammekins, and Camfer, S.S.w.
Within the Foſſe of Caen, S. S. E.
Calice-road and Diepe, S.S.E.
At Bolein, Calice, Gravelin, and Dunkerk, half tide, S. and N.
The Iland of Baſſe, S. E.
Within the Seyne before the Caſquets, and before Garnſey, S. E.
Before Cherborough, and the Raſe of Blanquet, S. and N.
At Newport half tide, S. and N.
At Seyne-head, S. S.w.
At Garnſey, and before Saint Poule, W. by S.
Bell Ile, and Holy Ile, S.w. by S.
Without Vſhant, and before Burdeaux, E. and W.
Britaine, Penmarke, Poitou, and Gaſcoigne, S. w.
Raſe of Fontenes, S.w. by W.
Bloy, and St. Mathews, W.S.w.
Abrowarth, and St. Mallowes, W. by S.
Before the Killiars, S.w.
Pormiſe, and before the River of Burdeaux, S.w.
From the Raſe to the Polehead S.w.
Before the River of Naunts, and before the Bay. S.w.
In the Bay within Vſhant, W.S.w.
At the Sept-Iſles, and at Calice in the Creeke, W.S.w.
Within the River of Roan, and from the Pole-head of Burdeaux, to the Forland of Fountaines before Brovage, in the River within all the Havens aforeſaid it floweth S.w. by W.
At St. Iohn de Luze, S.S.E.
At Conſalo, and St. Malo, E. and W.
At Cape St. Maries, E. by E.
On all the Coaſt of Biſcay, Galizia, Portugall, and Spaine, it floweth Southweſt and N. eaſt.

Scotland.

At S. Magnes ſound, S.E. by E.
At Faire Iles, S.E.
In the Frith, S. S.E.
Faire-Iſle Roades, S. by E.
At Orkney, E.S.

England.

At Barwick it flowes, S.S.w.
At the Staples halfe tide, N.E. by E.
At Hownecliffe-foot halfe tide, N.E. by E.
At

At Flambrow-head one quarter tide, E. N. E.
At the Shoo, S. and N.
At Tinmouth a quarter tide, S. W.
At the Sporne, W. by S.
Newcastle and Humber, W. by S.
Winterton, E. S. E.
Black-tayle and the Nowre, S. by W.
Blackpey and the Shields, E. & W.
Yarmouth, S. E. by E.
Orford and Albrow, S. E. by S.
Whitbay and Robin-hoods bay, S. W.
Betwene Hartlepoole, S. W.
Scarborow a quarter tide, W. S. W.
Hol and Lin halfe tide, E. and W.
Betwene Humbers mouth, N. W.
At Burnham one quarter tide, E. and W.
Cromer S. E.
At Leiflow a quarter tide, S. S. E.
Harwich and Dover, S. S. E.
Harwich within, S. by E.
South Forland, S. S. E.
Betwixt Margate and Thames mouth S. by E.
Leigh and Kentish-knock, S. & N.
Spits and along the Swine, S. and N.
Betweene Tinmouth and Flambrow-head, S. W.
Betweene Flambrow-head and Bridlington bay, S. W. by W.
Betweene Bridlington and Lawrence, W. S. W.
Betweene Lawrence and Cromer along the Well, halfe tide, E. and W.
Betwixt Cromer and Yarmouth road, S. E.
Between Laistow road and Orfordneſſe S. E. by S.
Betweene Orford and Orwell waves, S. S. E.
Betweene the Naze and the Ware-head of Colne, S. by E.
At the West end of the Note, S. by W.
Rochester and Malden, S. by W.
At Gravesend, S. S. W.
London and the mouth of the Heads of straights, S. W.
At the North Forlands, S. S. E.
At Beachy, S. and N.
Beaven Cliffes, S. E.
In the Downes, S. S. E.
In the Camber and at Gore-end S. by E.
At Camberneſſe, and at the Needles, S. E. by S.
In Camberneſſe road, S. S. E.
Portsmouth, Hampton, and the Ile of Wight, S. and N.
In the Offing from the North Forland, to the South Forland, it runneth halfe tide, and from the South Forland to the Naſſe, it runneth halfe tide, and halfe quarter tide, and

and from the Neſſe to Fairly halfe tide, and from Fairly to Beachy, one quarter tide under other.

At Portland Road, E.S.E.
At S. Ellens, S.E.by E.
Within the Race of Portland, At Poole, in the Haven, at Home-head, and thwart of Plymouth and Dartmouth, S.E.
At Waymouth E.and W.
At Famouth, Foy, Fourne, Plimouth, and Dartmouth, W. by S.
Briſtow and Foulneſſe, E. by S.
At the Start, E. by S.
Moſhole, W.S.W.
S. Davids head, E.and W
Milford-haven, E.S.E.
Ile of Man and Catnes, S.E.
Three leagues of the ſhore, at the Lizard to the ſhore, and to the Lands-end, E.S.E.
Within Torbay, and in the bay of Carnarven, W.by S.
At the mouth of Severn, W.by S.
At the Moonles, W.by S.
From, the Lizard to the Sorlings W.by S.
Before Silly in the Channell, E.and W.
At Silly halfe tide, S.S.W.
Within Mounts Bay and in the Sea of Wales and Severne, W.S.W.
At Lundy and the Holmes of Briſtow, E.and W.
In the Sleeve betweene Silly and Vſhant, S.and N.
Note that the ſtoud ſets in at the Eaſt end of Wight till a Southeaſt Mone: in the Road of Dungeneſſe, South Southeaſt, but without in the Channell a Southweſt Mone full Sea: from the Seames, and in the broad ſound betweén it and Uſhant the ſtoud runneth Eaſt Northeaſt, and Weſt ſouthweſt.

Ireland.

At Caldy, W.by S.
Waterford and Abermoricke, E.and W.
At Cape cleere, E.S.E.
Macknels Caſtle, S.E. by E.
Dublin and Lambay, S.E.by E.
Dunbar and Kildien, S.E.
Dungarum, Kinſale, Corke, Haven and Baltemore, W.S.W.

The Course of all the Coasts of *Holland*, *Zealand*, *France*, and *Spaine*, upon what Point, and what distance they are.

From the Ile of Texell unto Egmont, S. & by W. leag. 5.
From Egmont unto the Maze, S.S.W.l.11.
From the Maze to the Wieling, S.W.l.12.
From the Wieling unto the head of Trait betweene Dover and Calice, W.S.W.l.18.
From the Ile of Wakeren or Flushing unto Calice, S.W.& by W.l.22.
From Blackneſſe unto Deepe, S.S.W.l.12.
From Deepe unto Seyn-head, or the River of Seyne, W.S.W.l.12.
From the Seyne-head, to the River of Cane, S.W.l.8.
From thence unto Cape de la Hague, N.W.l.12.
From thence unto the Caskets, W.& by N.l.8.
From the Caskets to Garneſey, S.W.& by W.l.4.
From Garneſey to St. Malo, S.S.E.l.10.
From Garneſey to the Sept-Iles, S.W.& by S. l.12.
From the ſeven Iles to S. Poule, W.S.W.l.8.
From thence to the Fourne, W.S.W.l.10.
From the Caskets to the Fourne, S.W.& by W.l.34.
From the Fourne to St. Mathewes point, S.S.E.l.3.
From thence to Fountenau or Founteynes, S.& by E. l.5.
From Uſhant to the Seames, a Sea-bord it, S.l.7.
From Fountenau to the Weſt Penmarques, S.E.l.7.
From thence unto the Ile of Croy, E. & by S. l. 12.
From the Weſt Penmarques to Bell-Ille, E.S.E.l.15.
From thence to Heys ſomewhat more eaſterly, S.E.l.12.
From thence againe untill within Piquilier, E.& S.l.10.
From thence againe unto Croyſill, E.& by S.l.9.
From Piquilier unto Heys. S. & by W.l.5.
From Heys to the Killiats, E.S.E.l.10.
From the Ile of Heys to Porthuis, S.E.& by E.l.12.

From

From St. Martins Iland, to the Burning Ile,	S.E.& by E.l.3.
From the Burning Ile to the Oyster banke,	S.s. E.l.3.
From St. Martins Ile to the Tower of Cordam,	s.& by E. l. 12.
From thence unto Bayone,	S.& N.l.28.
From Bayone to Orio,	W.s.W.l.5.
From Orio unto S. Iohn de luz.	E.s.E.l.6.
From Orio unto St. Andrew,	W.& by s.l.23.
From St. Andrew to Cape de Penas,	E.& W.l.30.
From Cape de Pennas to Ribadeo,	s.W.& by W.l.12.
From Cape de Pennas to Ortegall,	W.& by W.l.20.
From Ortegall to Ribadeo,	E.l.14.
From Ortegall unto the Ile of Cizarga,	S.W.& by W.l.13.
From Cizarga unto Coronna,	E.S.E.l.6.
From thence to Cape Coriana,	W.S.W.l.10.
From Coriana to Cape Finesterre,	s.& N.l.3.
From Finisterre unto Bayone,	s. E.& by s. l.14.
From Bayone unto Port de Port,	s. s. E.l.18.
From Port de Port to Aveiro,	s.& N.l.8.
From Aveiro to Montega,	s. s. W.l.5.
From Montega unto Barlings,	s.W.l.12.
From Barlings unto Roxende,	s. & by E.l.12.
From Roxende to St. Uves point,	s. E. & by s. l.8.
From thence unto the Cape of St. Vincent,	s. & N. l.24.
From thence unto Pharo,	E. & W.l.14.
From Pharo unto Lepe,	N.E. & by E. l. 12.
From Praro unto Saltees,	E.N.E.l.18.
From Saltees to Chipiona,	s.E.l.8.
From Chipiona to Calis Malis,	s.E.l.6.
From Calice unto the straight of Gibralter,	s.E.l.8.
From Calis unto Cape de Cantin,	s.W. & by s.l.60.
From Cape de Cantin to the Ile of Madera,	W.l.140.
From Cape St. Vincent to Madera,	S.W. & by W.l.115.
From Roxende to Madera,	S.W.l.130.
From Roxende to the Ile of Tercera,	W.l.210.

The Courſes of *England*, *Ireland*, and *Scotland*.

From Boecknes unto Leeth in Scotland, S.S.W.l.28.
From Leeth unto Barwicke, S.S.E.l.8.
From Barwicke unto the Holy Ile, E.S.E.l.6.
From St. Abbes-head to the Caſterne end of Farne Iles, S.E.l.6.
From the Iles of Farne to the Tees-mouth, S.S.E.l.16.
From the River of Tees to Flambrow-head, S.E. & by E.l.14.
From Flambrow-head to Blackney, S.E.l.18.
From Blackney unto Winterton, S.E.l.8.
From Winterton unto Leſtoffe, S. & by E.l.8.
From Leſtoffe unto Orford Haven, S.l.7.
From Orford unto the Foreland, S.S.E.l.13.
From the Foreland to Dover, S.l.5.
From Dover to the Shingles, or the Neſſe point, S.W. & by W.l.7.
From the Neſſe point unto the Beache, W.S.W.l.6.
From the Beache to the Ile of Wight, W. & by S.l.15.
From Wight unto Portland, W. & by S.l.10.
From Portland to the Start point. W.S.W.l.14.
From the Start unto Ramhead point, W.N.W.l.6.
From Ram-head unto the Dodmans point, W.S.W.l.8.
From Dodmans to the Lizard point, S.W. & by W.l.6.
From the Lizard to the Iles of Silly, W.l.12.
From the Lizard to the Lands-end W.N.W.l.8.
From the Lands-end to the Ile of Lundy, N.E.l.14.
From thence unto the Holmes of Briſtow, N.E. & by E.l.15.
From thence unto the Ile of Caldy, W.S.W.l.15.
From thence to the Iles of Salteys, on the Coaſt of Ireland, W.N.W.l.20.
From Salteys to Cape-cleere, W.S.W.l.25.
From Cape-cleere to the Ile of Dorſey, W.l.12.
From the point of Dorſey to the Ile of Blakem, N.N.W.l.16.
From Blakem unto the Iles of Arrant. N.N.E.l.14.
From the Iles of Arrant to Galwicke, or the Galſe in Ireland, E.N.E.l.6.

Of divers and sundry Courses over the Westerne Sea.

From the Texell on the Coast of Holland to Flambrough, W.N.W.l.45.
From Texell unto Winterton in Norfolke, W.l.32.
From the Ile of Texell unto Lestoffe, W.& by S.l.28.
From the River of the Maze in South Holland, unto Harwich, W.l.26.
From the said Maze to the Foreland of England, W.& by S.l.25.
From the Marsdeepe in South Holland, to the said Foreland, S.W.l.36.
From the said Marsdeepe to Calice, W.& by S.l.38.
From Dover unto Boloigne, S.E.l.8.
From Boloigne unto the Beache, W.l.16.
From the Beache, to Diepe in Normandy, S.E.l.18.
From Diepe unto the Ile of Wight, E.S.E.l.28.
From Wight to the *Sein*-head or mouth, S.E.l.28.
From the said River of Seyne to Portland, W.N.W.l.30.
From the Ile of Wight unto the Caskets, S.W.& by S.l.14.
From Garnesey unto St. Malo in Normandy, S.S.E.l.8.
From the Caskets to Portland, N.& by W.l.20.
From the Caskets to the Start point, W.N.W.l.16.
From the Start to the Sept-Iles in Normandy, S.S.E.l.24.
From Start to S. Poul in Normandy, S.& by W.l.22.
From S. Poul to Portland, N.E.& by N.l.32.
From the Fovrnes to Ram-head, N.N.E.l.28.
From the Start point unto Vshant, S.W.& by S.l.32.
From the Fournes to the Lizard, S.& N.l.22.
From Vshant to the Iles of Silly, N.N.W.l.26.
From the Sorlings to Milford Haven, N.& by E.l.25.
From the Sorlings to Wexford in Ireland, N.N.W.l.34.
From the Sorlings to Cape Cleere, N.W.l.42.
From Cape Cleere to Cape de Finesterre, S.& N.l.130.
From the Lizard to Cape de Finesterre in Galicia, S.S.W.l.112.

From Uſhant unto the Ile of Cizarga in Galizia, S.S.W.l.85.
From Vſhant to Laredo in Biſcay, S.S.E.l.85.
From the Seame Rockes to St. Sebaſtian in Biſcay, Southeaſt & by S.l.10.
From Uſhant againe to Cape de Pannas in Biſcay, S.& N.l.20.
From Belile unto Ortegall in Galizia, S.W.l.75.
From St. Martins Ile to Ortegall, W.S.W.l.85.
From Ortegall to Cape de Coriana, S.W. & by W.l.24.
From Capo de Fineſtere to the Iles of S. Michael, W.S.W.l.185.
From St. Michael to the Ile of Tercera, N.W.l.26.
From Cape de Fineſterre to the Ile of Madera, Southweſt & by W.l.190.
From Madera unto the great Ile of Canary. S.E. & by E.l.60.
From Cape de Fineſterre to Bayone in Galizia. S.E. & by E.l.15.
From Cape de Fineſterre to the Ile of Barling. S.& N.l.50.
From the Barlings in Portugal to the Ile of Canary, S.S.W.l.170.
From the Ile of Madera to Calis Malis, E.N.E.l.150.
From Calis to Cape de Cantin, S.W.& by S.l.65.
From Cape de St. Vincent unto Cape de Cantin, S.& N.l.62.
From Cape de St. Vincent unto the Ile of Madera, Southweſt, & by W.l.120.
From Roxe in Portugal unto the Ile of Tercera, E.& W.l.210.

The Courſes of *Norway, Swethland,* and Eaſt *Finland.*

FRom Schuytenes to the Veſteen, S.& by E.l.4.
From Veſteen or Woſtone to the Ieddor. S.S. E.l.4.
From the Iedder to the Vorſteene or Forſtone, S.E.l.5.
From the Forſtone to the Noes, E.S.E.l.6.
From the Noes unto Reperwicke, E.N.E.l.8.
From Reperwicke to Mardon, N.E.l.10.
From Mardon unto Iofferland, N.E.l.8.
From Iofferland to Langheſoundt, N.N.E.l.2.
From Langheſoundt to Ferderoer, N.E.& by E.l.6.

from

From Ferderoer unto Soen-water, N.l.6.
From Ferderoer unto Roeghe, N.N.E.l.4.
From Ferderoer unto Akerſound, E.N.E.l.6.
From Akerſound to Maerſterland, S.E.& by E.l.4.
From Pater noſter to Nydrinke, S.E.l.8.
From Nydrinke to Waerbergh. S.E.& by E.l.4.
From Waersbergh to Swedoroer, S.S.E.l.6.
From Swedoroer unto Col, S.S.W.l.3.
From Col unto Lapſand, S.E.l.3.
From Lapſand unto Ween, S.S.E.l.2.
From Ween to Drakeriffe, S.& by E.l.7.
From Steeden to the North end of Bornhlme, E.& by N.l.15.
From Borneholme unto Anno, N.& by W.l.8.
From Anno unto the Rockes, N.E.l.8.
From Drakeriffe to Steeden, S.& by W.l.4.
From the Rockes untill within the Calmerſond, N.N.E.l.10.
From Calmerſond to the Swediſh Ionckfrow, N.N.E.l.8.
From Ionckfrow to Landfoort, N.N.E.l.8.
From thence untill before Dury-haven, N.E.& by E.l.8.
From the Stock-homes Shares to View of Abo, N.E.& by N. l.24.
From View unto Luns Vtſchares, E.N.E.l.28.
From the Utſchares to the Ile of Putſuagto, E.& by N.l.30.
From thence unto Somere, E.& W.l.9.
From Somere unto the Red-hole of Wiburgh, N.E.l.9.
From the Red-hole to Traelſand, N.E.& by N.l.2.
From thence unto Wiburgh. leagues 2.

The

The Depth and Soundings, neare divers Provinces. And first of *Gascoigne*, *Poictou* and *Britaine*.

WIthout the River of Burdeaux, there is 14 fatham depth, but when you come within the sight of Cordam Tower, 30 fatham.

Over against the Coast of Poictou, 16 leagues without Oleron, you have 35 fatham, but comming neere the land 8 leagues from the shore, you have 35 fatham: In the Channell betweene Portluis and Heys, it is 30 fatham and as much in the Channell of Heys: as also betweene Heys and Belile without the Channell is 35 fatham but within 25: without Heys, two kennings off, there is found 45 fatham.

Twenty two leagues Southward of Belile is 70 fatham, but 9 leagues from the Northwest point of that Iland; towards the Southwest is 60 fatham: and over against the midst of Belile, in 40 fatham depth, you shall see land. In your course betweene Belile and the Seames, you must come no neerer, then 50 or 45 fatham, if you saple from Belile West and by North: when you are against Gloyland, you shall find 60 fatham depth, without and within the Rocke which stands off Gloyland to the Southwards, you have 40 fatham water: in 60 fatham depth without the west Penmarkes, you may saple Northwest by West without the Seames, but by night come no neerer then in 55 fatham, for the ground is grosse and red and full of red Flints: halfe a league West southwest off the Seames, is a ledge of Rockes where you have 7 fatham depth, but betweene the Seames and the Rocke is 50 fatham.

In the Channell betwæn the Seames and Ushant, is 55 fatham depth, the ground is grosse and red sand, with little round stones red and blacke: neere to Ushant is 45 fatham but within it is of a variable depth: Southwest almost 6 leagues off Vshant, you

you have 70 fatham and the ground is fine white sand with little white shelles, and other small things like needles, and then is Vshant East from you: but if the sand be grosse and white, mingled with great and white shelles, then it is Southeast to you: but if you doubt of these Grounds goe northerly, if your Sound be deeper, then are you towards the Seames, but if not so deepe then are you in the channell almost north of Vshant.

Between Vshant and Obuerack, in the trade, it is 60 fatham depth: Between Vshant and the Sorlings in the middest of the Channell there is 70 fatham: between the Seames and Vshant, in 70 fatham water, the ground is of little black stones easie to be broken, and of yellow earth and clay: but if you find red and hard sand, goe Northward till you happen on white sand mingled white long streakes, and then you are in the Channell.

If from Cizarga you saple North northeast in the Spanish seas toward Vshant, and find your selfe in 80 fatham, you are 14 or 15 leagues off Vshant, but comming nearer you shall have 70 fatham water, and be 10 leagues from Vshant: but if you find the ground to be yellow shelles and little black stones, then are you towards the Seames; therefore you must with the tyde beare off northward to shun Vshant, untill you find white sand and things like needles, for such are the grounds of the channell.

Between Vshant and the Ile of Base, when you saple at foure fatham water you are 4 leagues off the shore, but by Night come no nearer then 25 fatham: When you are two leagues of Obverack, you shall find 25 fatham depth, but 8 leagues off the Sept Ilands you have 55 fatham.

A league without the Rockes of Obverack, there is a blind or hidden Rock: so that if you were to saple upon a bord between the Fournes and Obverack, come no nearer the blind Rock then 40 fatham, but Eastward you may saple in 30 or 25 fatham.

If a Ship sayling West S. W. and Southwest by W. off Silly at 80 fatham water, be found to be under 41 degrees 15 minutes of Altitude she is 26 leagues from Land, and must goe East and by north till she get 66 fatham water; for then she is in the Channell betweene Silly and Vshant, and then if she be bound for

England, he muſt ſayle more Northward and betweẽ the Lands end and the Lizard, he ſhall have 55 fatham depth.

The Soundings and Grounds betweene *Ireland*, *England*, and *Normandy*.

Three leagues without the Iles of Dorſey neare Ireland, it is 45 fatham deepe: In the Channell between Dorſey and Cape-cleare is 42 or 43 fatham, the Channell from Cape-cleare to Saltees hath 45 fatham, but two leagues off Ireland it hath but forty: Between Saltees and Milford it is 44 fatham deepe, and betweene Lundy and Silly is 38 fatham: In the mid way betweene Silly and Milford is 44 fatham, but North of Silly 40 and 41, and neare England by the Lands end, the Channell is of 50 fatham deepe.

Comming from Cape Finiſterre, ſayling S. S. E. if you have 80 fatham, you are 20 leagues off the ſhore, and the ground is ſmall black ſtones with great red ſand: In the ſame courſe, when you have but 60 fatham, you are within 12 or 14 leagues off the ſhore, but ſhall not ſo ſone kenne land as you thinke for; you ſhall a great while have 60 fatham: being at the S. parts of the Channell about Silly: betweene Vſhant and Silly, the channell is 70 fatham: on the S. ſide of Silly, the ground is ſmall red ſtones, and fine white ſand: Over againſt the Lizard and Falmouth foure leagues from ſhore is 52 fatham: betwixt Foy and Plimouth ſound, in the Channell nigheſt is 60 fatham, betweene the Lizard and the Start, beare no neerer the ſhore then 35 fatham, you may caſt anchor in the trade or Channell in 25 fatham, and ſo you ſhall lye within the Foreland ſtreame: betweene Plymouth and the Sept-Iles, in the middeſt of the Channell is 55 fatham, but 4 leagues S. S. W. off Plymouth is but 35 fatham: S. S. E. off the midland of the Start, is 45 fatham, but from thence 5 or 6 leagues S. E. is 54 fatham: in the Channell betweene the Caskets and Portland is 40 fatham, and a league S. of the Ile of Aldernay, is a hole or Pit 80 fatham deepe, all the reſt of the channell betweene Portland and Aldernay, is of equall depth, viz. 40 fatham:

fatham: when you are within kenning of Portland your founding is 34 fatham: and two leagues of Wight 36 fatham: alſo two leagues Eaſtward of Beachy, betweene Picardy and Wight, the Channell in the midſt is 38 fatham: betweene Winchelſey and Picardy is 24 fatham, the ſhoalds betweene the heads called the Urowenſand, hath but 3 fatham and a halfe, but on the Southſide of it is 24 fatham: and in all the faire way betweene Zealand and Dover, it is 24 fatham deepe.

Depths of the North Sea from the *Foreland*.

IN the Channell from England, Foreland and ſands of Flanders, you have 24 fatham deepe: but 3 leagues N. W. by W. off the Country of Zierrickze called Botbrecke, it hath but foure fatham depth without the ſhoald: the Channell of Zealand is 26 fatham N. W. off Harlem, 8 or 9 miles within the Sea, there beginneth a ſhelfe called De breede Verthien, reaching alongſt the Coaſt of Holland, to the plaine of Ameland, where it endeth: Over againſt Harlem and Egmont is 13, 14, or 15 fatham, and the ground is full of Mafe, mingled with black ſand like Muſtard-ſeed: the ſaid ſhelfe hath 15, 16, or 17 fatham depth: Betweene Texell and Vlyeland, where the ground is groſſe red ſand, 6, or 7 leagues from the ſhore, for there the ſhoald is narrower then it is towards the South end of the Channell: without the ſhoald betweene Zealand and Texell is 26 fatham deepe, as farre as the ſhoald which the Fiſhers call Dog-ſand. In the Channell on Englands ſide, over againſt Yarmouth is 35 fatham, but againſt Flamborough and Scarborough point 38 fatham, whereas the whole ſhelfe called Dog-ſand beginneth (reaching into the North Sea to the Channell of Hollandland, this ſhoald where it is within kenning of Flamborough point) hath but 9 or 10 fatham, but when in the ſame ſand you find 12 fatham, then Texell is from you Southeaſt almoſt 30 leagues, but when you come to 16 fatham, then are you within 21 leagues South ſoutheaſt of Vlyeland.

A ſhip that comes from the Rife, finding 18 fatham depth on the aforeſaid ſand, is then 20 leagues South and by Eaſt of

Ulyeland, but at 22 fatham you muſt then ſayle towards the Ulye South and by weſt, and South ſouthweſt, but if in the Channell of Helichland, 24 or 26 fatham be found, then muſt you ſayle Southweſt, and Southweſt by ſouth, and then you come to the Shellingh: but if in Helichland Sound you have 27 fatham, then are you altogether to the Eaſtward of it: betweene the Riffe and the Doggerſand the Channell is 26 fatham: without the channell Weſtward, it is 32 fatham déepe.

A Ship that comes out of the Engliſh ſtraights, or out of Zealand, having at the Riffe 24 fatham, is from the Naes in Norway, 18 leagues North and by eaſt, but having 20 fatham is then 18 leagues off it North by weſt: The courſe from thence to the Holmes, is 12 leagues North by eaſt: from thence to the point of Schagens is 18 leagues Northeaſt by eaſt; there is a Rock of one fatham depth Northeaſt, and northeaſt by eaſt off the Holmes 2 leagues from thence.

Depths neere *Iutland* and *Ameland*.

IN the Sea without Iutland, a mile from Dodenbergh, is a Banke called Reeſe-horne, ſtretching out 8 leagues Weſt by ſouth, in ſome places but three fatham déepe, and in ſome places may be ſayled over, and become a Road for a Northweſt and a northerly wind in 20 fatham: From Ameland towards the Sea, the ground is groſſe ſand, red and black mingled with ſhells: thence Southwards in 16 fatham ſayling three houres, you ſhall come to the Dutch Sea of Ameland, where the ground is fine ſand with ſhels: North from Schellingh in 24 fatham is fine white ſand, and in 8 fatham white and black ſand mingled, Ulyeland hath white ſand with ſhelles, and thin black ſand in 16 fatham depth: From the Weſt end of Vlyeland, is great and red ſand mingled with black like unto Muſtard-ſeed: about five or ſeven leagues from thence at the Eaſt end of Schellingh to Seawards at 18 fatham, is fine white ſand mingled with black, having in it things like needles. Over againſt Borke in the Weſterne

Emes

Emes at 17 or 18 fatham depth, land may be seene: the ground is grosse gravelly sand: At 14 fatham may Ameland be kend, but Schellingh at 16, and Vlyeland at 15 or 16 fatham water. At the North Hooke of Texell, land may be seene at 16 fatham. Holland at 14 or 15. When you sayle within the shoald called the Breduirthien, which beginneth Northwest of Harlem, and stretcheth along the coast of Holland to the West end of Vlyeland, it is 7 or 8 leagues from the shore.

Soundings and Grounds neere the *Schaw*.

A Great league West by north from the Schaw, is 35 fatham depth: North northeast a great league off the corner of this point is 38 fatham, and when the point is northeast from you, then you have 17 fatham. Between this point and Leson, the Channell is 20 fatham deep, and the ground like clay or dirt: Betwixt Anhout and Waersbergh, in the midst of the Channell is 22 fatham water: betweene Leson and Anhout, the ground is fine and stony: neere Waersbergh is a shoald of 17 fatham depth: betweene Anhout and Coll is another shoald of 17 fatham, where sometime it is troublesome like a Whirle-pole.

Depths of the Easterne Seas.

BEtweene Oeland and Gothland, the soundings are unequall, sometimes of 20, sometimes of 23 fatham, the ground grosse and black stony sand like Peale: when the South end of Oeland is 2 leagues from you Westwards you have 27 fatham, where also you may gage water: but when the Chappell of Sudernoorden beareth West northwest off you, then have you 31 fatham, and ground fit to gage water: Over against the Rock in the faire way is 52 fatham and a clay ground, but fit for gaging: Betweene the greater and lesser Carta is 14 fatham, under which is a safe road for ships, there is a shoald betweene Houbergh and Ostergard 14 fatham depth, the ground great red sand, but hardly from thence can you ken Gothland but of the top: there is also to

the Eaſtward another ſhoald of 36 fatham, which when you are paſt you have more then 40 fatham water: when the point of Righ is three leagues Southeaſt from you, then have you 30 fatham: but when it is from you halfe a league South ſoutheaſt, you have but 15 fatham, and the ground is white ſand: but when it beareth Weſt a ſmall league from you, then you ſhall find 16 fatham: Over againſt Heel halfe a league from the ſhore it is almoſt 3 fatham deepe: the road for Ships to Heel, hath 25 fatham depth: Betweene Moan and Falſterbourne is 14 fatham depth: betweene Stead and Falſterbourne in the very Channell, is but 12 fatham deepe: neare Falſterbourne it is full of ſhoalds, but neare Stead you have 13 fatham water: Between Dark-riffe and Southolmen, which is more ſhoaldy, there is 3 fatham wanting two foot: from thence toward the Sound it is no deeper then 6, 7, 8, 9, or 10 fatham.

A note of certaine and moſt dangerous Places in the Sea.

THe principalleſt and moſt perilous of all, is the Mael-ſtream-well or Slorp, called the Mouskſtreame: which lyeth on the back-ſide of Norway in 68 degrees on the North-ſide of an Iland or Rock called Weeray. This Well draweth the water unto it ſelfe during the whole flood (which is the ſpace of 6 houres and 12 minutes) with ſuch an indraught and force, and with ſuch a noyſe through the tumbling and falling of the waves & ſtreames one upon the other, that it is rather to wonder at then to write of. So that during that time, within the ſpace of more then two leagues round about that Rocks of Mouske (under which that water floweth) no Ship or other veſſell may come neare, for they ſhould to their utter deſtruction be drawne into it and ſwallowed up: but all the time of the Ebbe the water is ſo ſtrongly caſt up againe, that no kind of ſubſtance or pettall, how heavy ſoever it be, can there ſtick; So that our Northern Fiſhers at that time doe with their Jollen or Fiſhing-boates, take many and ſtrange formed Fiſhes, which they draw into their Boates with

Pokes

hookes and Lines, which they have ready layd for that purpose: for that during the Ebbe, they cannot returne into the Gulph, nor get under water by any meanes.

The Northerne people that inhabite about those Rocks, doe thinke that streame passeth away underneath a part of Norway, under the North bottome in East Finland; because that in that place there is likewise such a Maelstreame (though not altogether so strong nor dangerous) where the like Fishes are taken: and the water is in like sort troublesome, as it is underneath, and about the Rock of Mouske.

Whereupon many experienced Pilots doe call the said Slorp, The Navell of the Sea, which causeth the courses of the Ebbes, and Floods about all the Lands that are on this North side of the Equinoctiall, as the most convenient place for that purpose, to spread the waters South, North, East, and West; that is to say, Northerly towards the Pole Artick, South-easterly on the back-side of Russia, and Tartaria, toward the straight of the great South-sea called Mar del Zur, wherein the Spirits Ilands (called the Moluccas, neere the Equinoctiall) are lying Southward the North-sea of these Low-Countries: As also on the back-side of Scotland and Ireland, towards the Spanish and Atlantick-Seas, and towards the Northwest beyond Izeland, towards Frobishers-straights, where it is thought the way unto Catay may be found.

There are moreover to be feared upon the Westerne Seas, very dangerous streames and Gulphes, as in the Race of Portland, where oftentimes happeth such turning and tumbling of waves and streames, that the Ships which passe that way, are many times in great perill.

Moreover the Race of Blanquert, betweene Normandy and the Iles of Alderney, roareth and rageth so dangerously, that many Ships fall therein headlong, so deepe, that sodainly they are swallowed up and sunke to the very bottome.

The Race of Fountney, is more dangerous then all these, wherein many small Vessels and Barkes of Britany and of other Countries, are suddenly devoured and cast away: and the entrance

trance of the Garrone, called the River of Burdeaux, betweene the Towers of Cordam and the Southerne and Northerne Asses, is likewise very perilous, and many ships doe often perish there if the Pilots be not skilfull and well acquainted with the place.

And therefore being the most full of danger, it behoveth each Pilot or Master to have especiall knowledge thereof, and great care to prevent the danger that may ensue unto them thereby.

The foure Termes.

Hillary Terme, begins January 23, and ends February 12.

Easter Terme, begins 17 dayes after Easter day, and ends the Munday before Whitsunday.

Trinity Terme, begins next Friday after Trinity-sunday, and ends on Wednesday 19 dayes after.

Michaelmasse Terme, begins 23 of October, ends November 23.

The yeares for which the Tables of the Sunnes place and Declination (following) serve.

First.	Second.	Third.	Leap-yeare.
1641	1642	1643	1644
1645	1646	1647	1648
1649	1650	1651	1652
1653	1654	1655	1656
1657	1658	1659	1660
1661	1662	1663	1664

Here-

Hereafter followeth a moſt excellent, neceſſary and compendious *Kalender*, ſhewing the *Prime*, *Epact*, *Dominicall Letter*, *Leap-yeares*, and moveable *Feaſts*, for 24 yeares, inclusively comprehending therewith the true Day and Houre of the Moones *Conjunction* or *Change*, for 19 Yeares to come; With the true Place of the Sunne, and his Declination from the Equinoctiall, both Northwards and Southwards upon every Degree thereof, through the 12 Moneths of the Yeare.

Year of our Lord	Prime	Epact	Sunday Letter	First Sunday in Lent.	Easter-day.	Aſcention day.	Whitſun-day.	Trinity-Sunday.
1641	8	28	C	March 14	April 25	June 3	June, 13	June, 20
1642	9	9	B	Febru. 27	10	May 29	May, 29	5
1643	10	20	A	19	2	11	21	May, 28
1644	11	1	G F	March 10	21	30	June, 9	16
1645	12	12	E	Febru. 23	6	15	May, 25	June, 1
1646	13	23	D	15	March 29	7	17	May, 24
1647	14	4	C	March 7	April 18	27	June, 6	June, 13
1648	15	15	B A	Febru. 20	2	11	May, 21	May, 28
1649	16	26	G	11	March 25	3	13	20
1650	17	7	F	March 3	April 14	23	June, 2	June, 9
1651	18	18	E	Febru. 16	March 30	8	May, 28	May, 25
1652	19	29	D C	March 6	April 17	26	June, 5	June, 12
1653	1	10	B	Febru. 27	10	May 19	May, 29	5
1654	2	21	A	12	March 26	4	14	May, 21
1655	3	2	G	March 4	April 15	24	June, 3	June, 10
1656	4	13	F E	Febru. 24	7	16	May, 26	2
1657	5	24	D	15	March 29	7	17	May, 24
1658	6	5	C	28	April 11	20	30	June, 6
1659	7	16	B	20	3	12	22	May, 29
1660	8	27	A G	March 12	23	June 1	June, 11	June, 18
1661	9	8	F	3	14	May 22	12	9
1662	10	18	E	Febru. 16	March 30	8	May, 18	May, 25
1663	11	1	D	March 8	April 19	28	June, 7	June, 14
1664	12	12	C B	Febru. 28	10	19	May, 29	5

The Prime			Fast	Leng. of the Day.	True Place and Declination. First yere after Leap yere, ☉ in ♑			South Declination.	☉ in ♒, second yere		
				H.M.		D.M.	D.M.			D.M.	D.M.
viij. 7.	1	A	New yea	7 52	1	21 44	21 46		1	21 30	21 48
	2	B	day.	7 54	2	22 45	21 36		2	22 31	21 38
2. xvj.	3	C		7 58	3	23 47	21 25		3	23 32	21 28
	4	D		8 0	4	24 48	21 14		4	24 33	21 17
v. 8.	5	E	Fast	8 3	5	25 49	21 3		5	25 35	21 6
	6	F	Twelfe-	8 6	6	26 50	20 51		6	26 36	20 55
2. xiij.	7	G	day.	8 9	7	27 51	20 39		7	27 37	20 43
ij. 10.	8	A	Lucian.	8 12	8	28 53	20 27		8	28 38	20 31
x. 17.	9	B		8 15	9	29 54	20 15		9	29 39	20 18
	10	C		8 18	10	♒ 55	20 2		10	♒ 40	20 5
xviij. 3.	11	D		8 21	11	1 56	19 48		11	1 41	19 51
vij. 4.	12	E		8 24	12	2 57	19 34		12	2 42	19 37
	13	F	Hilary.	8 28	13	3 58	19 20		13	3 43	19 23
2. xv.	14	G		8 32	14	4 59	19 5		14	4 44	19 9
	15	A		8 36	15	6 ♓	18 50		15	5 45	18 45
iiij. 2.	16	B		8 40	16	7 2	18 35		16	6 46	18 30
xij. 11.	17	C		8 43	17	8 3	18 19		17	7 47	18 23
ix. 5.	18	D		8 46	18	9 4	18 3		18	8 48	18 7
vj.	19	E		8 49	19	10 5	17 47		19	9 49	17 51
	20	F	Fabian.	8 52	20	11 6	17 30		20	10 50	17 35
	21	G	Agnes.	8 55	21	12 7	17 13		21	11 51	17 18
6. xvij.	22	A	Vincent.	8 58	22	13 7	16 56		22	12 52	17 1
	23	B		9 0	23	14 8	16 38		23	13 53	16 44
xj.	24	C		9 2	24	15 9	16 20		24	14 54	16 26
	25	D	Conversi.	9 4	25	16 10	16 2		25	15 55	16 8
xviij. xj.	26	E	of Paul.	9 6	26	17 11	15 44		26	16 56	15 49
12. iij.	27	F		9 9	27	18 12	15 26		27	17 57	15 30
5. xj.	28	G		9 12	28	19 12	15 7		28	18 58	15 12
13.	29	A		9 15	29	20 13	14 48		29	19 58	14 53
8. viij.	30	B		9 18	30	21 14	14 28		30	20 59	14 33
	31	C		9 21	31	22 14	14 9		31	22 0	14 13

of the Sunne.

	☉ in ♈, third yeare		☉ in ♈ Leap-yere	
	D.M.	D.M.	D.M	D.M.
1	21 15	21 51	1 21 c	21 53
2	22 16	21 41	2 22 1	21 43
3	23 17	21 31	3 23 2	21 33
4	24 19	21 20	4 24 4	21 23
5	25 20	21 9	5 25 5	21 12
6	26 21	20 57	6 26 6	21 0
7	27 22	20 45	7 27 7	20 49
8	28 23	20 33	8 28 9	20 37
9	29 24	20 21	9 29 10	20 24
10	♑ 26	20 8	10 ♑ 11	20 11
11	1 27	19 54	11 1 12	19 58
12	2 28	19 41	12 2 13	19 45
13	3 29	19 27	13 3 14	19 31
14	4 30	19 12	14 4 15	19 16
15	5 31	18 57	15 5 16	19 2
16	6 32	18 42	16 6 17	18 46
17	7 33	18 27	17 7 18	18 30
18	8 34	18 11	18 8 19	18 15
19	9 35	17 55	19 9 20	17 59
20	10 36	17 38	20 10 21	17 43
21	11 37	17 21	21 11 22	17 26
22	12 38	17 4	22 12 23	17 9
23	13 39	16 47	23 13 24	16 52
24	14 40	16 29	24 14 25	16 34
25	15 40	16 11	25 15 26	16 16
26	16 41	15 53	26 16 27	15 58
27	17 42	15 35	27 17 27	15 40
28	18 43	15 16	28 18 28	15 21
29	19 44	14 57	29 19 29	15 2
30	20 44	14 38	30 20 30	14 34
31	21 45	14 18	31 21 31	14 24

South Declination.

A Table of the Sunnes equall motions of *Longitude* and of the *Apogee* for the yeare 1637 Compleat, and for single yeares, from 1 to 20, in Sines, Degrees and Parts.

	Longitude Si. de. parts	Apogee. Si. de. parts.
1637	9.20.9895	3. 6.3689
1	11.29.7616	00.00.0173
2	11.29.5225	00.00.0344
3	11.29.2838	00.00.0514
4	00.00.0308	00.00.0686
5	11.29.7922	00.00.0855
6	11.29.5533	00.00.1028
7	11.29.3147	00.00.1200
8	00.00.0816	00.00.1369
9	11.29.8229	00.00.1542
10	11.29.5841	00.00.1711
11	11.29.3445	00.00.1883
12	00.00.0925	00.00.2053
13	11.29.8536	00.00.2225
14	11.29.6150	00.00.2400
15	11.29.3764	00.00.2571
16	00.00.1233	00.00.2739
17	11.29.8844	00.00.2911
18	11.29.6458	00.00.3080
19	11.29.4072	00.00.3251
20	00.00.1539	00.00.3415

The Prime				Leng. of the Day.	True Place and Declination. First yere after Leap yere, ☉ in ♒				☉ in ♒, second yere			
				H.M.		D.M.	D.M.			D.M.	D.M.	
2. viij.	1	D	Fast	9 30	1	23	13	13 49	1	23	0	13 34
7. xvj.	2	E	Purificat	9 33	2	24	15	13 29	2	24	1	13 34
	3	F	of Mary	9 37	3	25	16	13 8	3	25	1	13 14
8.	4	G		9 41	4	26	17	12 48	4	26	2	12 53
xiij. 12.	5	A	Agathe.	9 45	5	27	17	12 27	5	27	2	12 33
	6	B		9 50	6	28	18	12 6	6	28	3	12 12
4. ij.	7	C		9 54	7	29	18	11 45	7	29	3	11 51
x.	8	D		9 58	8	♓	18	11 24	8	♓	4	11 30
	9	E		9 2	9	1	19	11 3	9	1	4	11 8
8. xviij.	10	F		10 6	10	2	19	10 41	10	2	5	10 46
2. vij.	11	G		10 9	11	3	20	10 19	11	3	5	10 24
	12	A		10 12	12	4	20	9 57	12	4	5	10 2
7. xv.	13	B		10 15	13	5	20	9 35	13	5	6	9 40
	14	C	Valentin	10 18	14	6	20	9 13	14	6	6	9 18
10. iiij.	15	D		10 22	15	7	20	8 50	15	7	6	8 56
3. xij.	16	E		10 26	16	8	21	8 28	16	8	6	8 33
j. 6.	17	F		10 30	17	9	21	8 5	17	9	6	8 11
	18	G		10 34	18	10	21	7 43	18	10	6	7 48
5. ix.	19	A		10 38	19	11	21	7 20	19	11	6	7 25
xviij. 11.	20	B		10 42	20	12	21	6 57	20	12	6	7 2
	21	C		10 46	21	13	21	6 34	21	13	6	6 39
	22	D		10 50	22	14	21	6 11	22	14	6	6 16
3. vj.	23	E	Fast	10 54	23	15	21	5 47	23	15	6	5 35
xiij. 11.	24	F	Mathias.	10 58	24	16	21	5 24	24	16	6	5 30
2. iij.	25	G		11 2	25	17	21	5 1	25	17	6	5 6
xj. 5.	26	A		11 7	26	18	20	4 38	26	18	6	4 43
	27	B		11 12	27	19	20	4 14	27	19	6	4 19
8. xix.	28	C		11 16	28	20	20	3 51	28	20	5	3 56
	29											

South Declination.

When it is Leap-yeare, *February* hath 29 dayes, and then is St. *Mathias* the 25 day.

of the Sunne.

☉ in ♓, third yeare			☉ in ♓ Leap yere		
	D.	M.		D.	M.
1	22	46	1	22	31
2	23	46	2	23	32
3	24	47	3	24	32
4	25	47	4	25	33
5	26	48	5	26	33
6	27	48	6	27	34
7	28	49	7	28	34
8	29	49	8	29	35
9	♈	50	9	♈	35
10	1	50	10	1	35
11	2	50	11	2	36
12	3	51	12	3	36
13	4	52	13	4	36
14	5	51	14	5	37
15	6	51	15	6	37
16	7	52	16	7	37
17	8	52	17	8	37
18	9	52	18	9	37
19	10	52	19	10	37
20	11	52	20	11	37
21	12	52	21	12	37
22	13	52	22	13	37
23	14	52	23	14	37
24	15	52	24	15	37
25	16	52	25	16	37
26	17	52	26	17	37
27	18	51	27	18	37
28	19	51	28	19	37
			29	20	36

	D.	M.	D.	M.
1	13	58	14	4
2	13	38	13	44
3	13	18	13	24
4	12	58	13	3
5	12	37	12	43
6	12	16	12	22
7	11	55	12	1
8	11	34	11	40
9	11	13	11	19
10	10	52	10	57
11	10	30	10	36
12	10	8	10	14
13	9	45	9	52
14	9	24	9	30
15	9	1	9	7
16	8	39	8	45
17	8	16	8	22
18	7	54	8	0
19	7	31	7	37
20	7	8	7	14
21	6	45	6	51
22	6	22	5	28
23	5	59	5	5
24	5	35	5	42
25	5	12	4	19
26	4	49	4	55
27	4	25	3	23
28	4	2	3	8
			3	45

South Declination.

A Table of the Sunnes equall motions of *Longitude* and of the *Apogæi* for the Moneths Compleat of the common Yeare, in Signes, Degrees and Parts.

	Longitude, Si. deg. parts	Apogæi. Parts.
Janu.	1, 00. 5550	.0014
Febr.	1, 28, 1530	.0028
Marc	2, 28, 7083	.0042
April	3, 28, 1775	.0035.8
May.	4, 28, 8328	.0069
Iune	5, 28, 4022	.0083
July.	6, 28, 9572	.1090
Aug.	7, 29, 5122	.0114
Sept.	8, 29, 0817	.0128
Octo	9, 29, 6367	.0142
Nov.	10, 29, 2061	.0155
Dece	11, 29, 7616	.0178

The Prime.				Leng. of the Day.	True Place and Declination. First yere after Leap yeare, ☉ in ♓.				☉ in ♈, second yere			
				H. M.	D. M.	D. M.			D. M.	D. M.		
	1	D	David.	11 20	1	21 20	3	27	1	21 5	3	33
7. viij.	2	E		11 24	2	22 15	3	3	2	22 5	3	9
xvj. 15.	3	F		11 28	3	23 15	2	40	3	23 5	2	45
	4	G		11 32	4	24 15	2	16	4	24 4	2	22
	5	A		11 36	5	25 15	1	52	5	25 4	1	58
10. v.	6	B		11 40	6	26 14	1	28	6	26 3	1	34
1. xiij. ij. 6	7	C		11 44	7	27 14	1	5	7	27 3	1	10
	8	D		11 48	8	28 13	0	41	8	28 2	0	47
8. x.	9	E		11 52	9	29 13	0	17	9	29 2	0	23
xviij. 7.	10	F		12 56	10	♈ 13	0	6	10	♈ 1	0	1
	11	G	Gregory	12 0	11	1 13	0	30	11	1 0	0	24
	12	A		12 4	12	2 12	0	53	12	2 0	0	48
8. viij.	13	B		12 8	13	3 12	1	17	13	2 59	1	12
xv. 9.	14	C		12 12	14	4 12	1	41	14	3 58	1	35
	15	D		12 16	15	5 12	2	4	15	4 57	1	59
iiij.	16	E		12 20	16	6 11	2	28	16	5 56	2	22
xij. 6.	17	F		12 24	17	7 10	2	51	17	6 56	2	46
	18	G	Edward.	12 28	18	8 9	3	15	18	7 55	3	9
5. ix.	19	A		12 32	19	9 8	3	38	19	8 54	3	33
ix. 10.	20	B	Benedict	12 36	20	10 7	4	1	20	9 53	3	59
	21	C		12 40	21	11 6	4	25	21	10 52	4	19
xvij. 6.	22	D		12 43	22	12 5	4	48	22	11 51	4	42
vj. 17.	23	E		12 47	23	13 4	5	12	23	12 50	5	5
	24	F	Fast	12 50	24	14 3	5	34	24	13 49	5	28
1. xiiij.	25	G	Annun-	12 54	25	15 2	5	57	25	14 47	5	51
iij. 8.	26	A	ciation of	12 58	26	16 0	6	20	26	15 46	6	14
	27	B	Mary.	13 2	27	16 59	6	42	27	16 45	6	37
9. xj.	28	C		13 6	28	17 58	7	5	28	17 44	6	59
xix. 18.	29	D		13 12	29	18 57	7	27	29	18 42	7	22
	30	E		13 18	30	19 55	7	49	30	19 41	7	44
viij. 19.	31	F	☉	13 24	31	20 54	8	12	31	20 40	8	6

South Declination. North Declination.

of the Sunne.

	☉ in ♓ third yere.		☉ in ♓ Leap yere		
	D. M.	D. M.	D. M.	D. M.	
1	20 51	3 38	21 36	3 21	
2	21 50	3 15	22 36	2 57	
3	22 50	2 51	23 35	2 34	
4	23 50	2 27	24 35	2 10	
5	24 49	2 3	25 34	1 46	
6	25 49	1 40	26 34	1 23	
7	26 48	1 16	27 33	0 59	
8	27 48	0 52	28 33	0 35	
9	28 47	0 29	29 32	0 11	
10	29 47	0 5	♈ 32	0 12	
11	♈ 46	0 19	1 31	0 36	
12	1 46	0 42	2 30	1 0	
13	2 45	1 6	3 29	1 23	
14	3 44	1 29	4 29	1 47	
15	4 43	1 53	5 28	2 10	
16	5 42	2 17	6 27	2 34	
17	6 41	2 40	7 26	2 57	
18	7 40	3 3	8 25	3 20	
19	8 39	3 27	9 24	3 44	
20	9 38	3 50	10 23	4 7	
21	10 37	4 13	11 22	4 30	
22	11 36	4 36	12 22	4 53	
23	12 35	5 0	13 20	5 16	
24	13 34	5 23	14 19	6 39	
25	14 33	5 46	15 18	6 2	
26	15 32	6 9	16 16	6 25	
27	16 31	6 31	17 15	6 48	
28	17 29	6 54	18 14	7 10	
29	18 28	7 16	19 13	7 33	
30	19 27	7 38	20 11	7 55	
31	20 25	8 1	21 10	8 17	

South Declination. North Declination.

A Table of the Sunnes equall motion of Longitude for Dayes and Houres, in Degrees and Parts.

	Dayes. Deg. Parts.	Houres. Deg. Parts.
1	00 . 9855	0 . 0411
2	01 . 9714	0 . 0822
3	02 . 9569	0 . 1233
4	03 . 9425	0 . 1642
5	04 . 9283	0 . 2035
6	05 . 9139	0 . 2464
7	06 . 8994	0 . 2875
8	07 . 8853	0 . 3286
9	08 . 8708	0 . 3697
10	09 . 8364	0 . 4105
11	10 . 8422	0 . 4517
12	11 . 8278	0 . 4928
13	12 . 8133	0 . 5339
14	13 . 7992	0 . 5750
15	14 . 7847	0 . 6189
16	15 . 7703	0 . 6572
17	16 . 7561	0 . 6980
18	17 . 7417	0 . 7392
19	18 . 7272	0 . 7803
20	19 . 7130	0 . 8214
21	20 . 6986	0 . 8625
22	21 . 6842	0 . 9036
23	22 . 6700	0 . 9444
24	23 . 6555	0 . 9855
25	24 . 6411	1 . 0066
26	25 . 6269	1 . 0678
27	26 . 6153	1 . 1089
28	27 . 5980	1 . 1500
29	28 . 5833	1 . 1911
30	29 . 5694	1 . 2319
31	30 . 5550	1 . 2730

The Prime				Leng. of the Day.	True Place and Declination. First yere after Leap yeare, ☉ in ♈.				☉ in ♈, second yere		
				H.M.		D.M.	D.M.		D.M.	D.M.	North Declination.
	1	G		13 30	1	21 52	8 34		1 21 38	8 28	
xvj. 4.	2	A		13 34	2	22 51	8 55		2 22 37	8 50	
	3	B		13 38	3	23 49	9 17		3 23 35	9 11	
v.	4	C	Ambrose	13 42	4	24 48	9 39		4 24 34	9 32	
xiij. 8.	5	D		13 46	5	25 46	10 0		5 25 32	9 54	
ij.	6	E		13 50	6	26 45	10 21		6 26 31	10 16	
x. 5.	7	F		13 53	7	27 43	10 42		7 27 29	10 37	
	8	G		13 56	8	28 41	11 3		8 28 27	10 58	
xviij. 2.	9	A		14 59	9	29 40	11 14		9 29 26	11 19	
	10	B		14 2	10	♉ 38	11 44		10 ♉ 24	11 40	
viij. 8.	11	C		14 5	11	1 36	12 5		11 1 22	12 0	
	12	D		14 8	12	2 35	12 25		12 2 21	12 20	
xv.	13	E		14 12	13	3 33	12 45		13 3 19	12 40	
iiij. 8.	14	F		14 16	14	4 31	13 5		14 4 17	13 0	
	15	G		14 20	15	5 29	13 24		15 5 15	13 19	
xij.	16	A		14 24	16	6 27	13 43		16 6 13	13 39	
j.	17	B		14 28	17	7 25	14 2		17 7 11	13 57	
	18	G		14 32	18	8 23	14 21		18 8 9	14 18	
ix.	19	D		14 36	19	9 21	14 40		19 9 7	14 36	
	20	E		14 40	20	10 19	14 58		20 10 5	14 54	
xvij.	21	F		14 44	21	11 17	15 17		21 11 3	15 12	
	22	G		14 47	22	12 15	15 35		22 12 1	15 30	
xiij. 8.	23	A	S. George	14 50	23	13 13	15 52		23 12 59	15 48	
	24	B	East	14 55	24	14 11	16 9		24 13 57	16 5	
v.	25	C	St. Mark	14 56	25	15 9	16 26		25 14 55	16 22	
xj. 2.	26	D		14 59	26	16 7	16 43		26 15 53	16 39	
	27	E		15 2	27	17 4	17 0		27 16 50	16 56	
x.	28	F		15 5	28	18 2	17 16		28 17 48	17 12	
viij. 2.	29	G		15 8	29	19 0	17 32		29 18 46	17 28	
	30	A		15 12	30	19 58	17 48		30 19 44	17 44	

of the Sunne.

	☉ in ♈ third yeare		☉ in ♈ Leap yere	
	D. M.	D. M.	D. M.	D. M.
1	21 24	8 23	22 8	8 39
2	22 23	8 45	23 7	9 1
3	23 21	9 7	24 5	9 22
4	24 20	9 28	25 4	9 44
5	25 18	9 49	26 2	10 5
6	26 17	10 11	27 1	10 26
7	27 15	10 32	27 59	10 47
8	28 13	10 53	28 58	11 8
9	29 12	11 14	29 56	11 29
10	♉ 10	11 34	♉ 54	11 50
11	1 8	11 55	1 52	12 10
12	2 7	12 15	2 50	12 30
13	3 5	12 35	3 49	12 50
14	4 3	12 55	4 47	13 9
15	5 1	13 14	5 45	13 29
16	5 59	13 34	6 43	13 48
17	6 57	13 53	7 41	14 7
18	7 55	14 12	8 39	14 26
19	8 53	14 31	9 37	14 45
20	9 51	14 50	10 35	15 3
21	10 49	15 8	11 33	15 21
22	11 47	15 26	12 31	15 39
23	12 45	15 43	13 29	15 57
24	13 43	16 1	14 27	16 14
25	14 41	16 18	15 25	16 31
26	15 39	16 35	16 23	16 48
27	16 36	16 52	17 20	17 5
28	17 34	17 8	18 18	17 21
29	18 32	17 24	19 16	17 37
30	19 30	17 40	20 14	17 52

North Declination.

To find the Sunnes place by these Tables of the equall motions.

First, we are to consider, that the Astronomers begin their Day at noone, as if I would seeke the Sunnes place the 17 of June 1636, at 9 of the cloeke in the Morning, I must seeke for it the 15 day 21 houres afternoone, But if I would seeke it the 17 day at 7 of the cloeke at night I must seeke it for the 16 day and 7 houres afternoone, & the like of all other.

Againe, there is to be considered when you would seek the Suns place, whether you are to the Eastwards or to the Westwards of London, for every 15 deg. to the Eastwards you must subtract one houre of time, and for every 15 degr. to the Westwards you must adde one houre of time.

Further, at any time of the Leap-years after Febr uary, you must make the time one Day more then it is, because the Table of the Moneths is but for the com-

The Prime			Fast	Leng. of the Day.	True Place and Declination. First yere after Leap yere, ☉ in ♉.				☉ in ♊, second yere			
						D.M.		D.M.		D.M.		D.M.
rx. viij.	1	B	Phil. and	H.M. 15 16	18	20	55	18	3	1	20	41 18 0
6. xvj.	2	C	Jacob.	15 20	19	21	53	18	18	2	21	39 18 15
vj. 9.	3	D	Inventio	15 23	3	22	51	18	33	3	22	37 18 30
	4	E	Crosse.	15 26	4	23	48	18	48	4	23	34 18 44
8. xiij. ij. 4.	5	F		15 29	5	24	46	19	2	5	24	32 18 58
	6	G	Joh. Port	15 32	6	25	43	19	16	6	25	30 19 12
4. x.	7	A	Latin.	15 35	7	26	41	19	30	7	26	27 19 26
	8	B		15 38	8	27	39	19	43	8	27	25 19 39
xviij. 9.	9	C		15 40	9	28	36	19	55	9	28	22 19 52
	10	D		15 42	10	29	34	20	8	10	29	20 20 5
9. vij.	11	E		15 44	11	II	31	20	20	11	II	17 20 17
xv. 8.	12	F		15 46	12	1	29	20	32	12	1	15 20 29
	13	G		15 48	13	2	26	20	44	13	2	12 20 41
8. iiij.	14	A		15 50	14	3	23	20	55	14	3	9 20 52
xij.	15	B		15 53	15	4	20	21	5	15	4	7 21 3
	16	C		15 56	16	5	18	21	16	16	5	4 21 13
	17	D		15 58	17	6	15	21	26	17	6	1 21 23
	18	E		16 0	18	7	12	21	35	18	6	59 21 33
6. ix.	19	F	Dunstan	16 3	19	8	10	21	45	19	7	56 21 43
xvij. ix.	20	G		16 6	20	9	8	21	54	20	8	54 21 52
vj. 8.	21	A		16 9	21	10	5	22	3	21	9	51 22 1
	22	B		16 12	22	11	2	22	11	22	10	48 22 9
8. xiiij.	23	C		16 14	23	11	59	22	18	23	11	46 22 17
iij. 1.	24	D		A6 16	24	12	57	22	26	24	12	43 22 24
	25	E		16 18	25	13	54	22	33	25	13	40 22 31
16. xj.	26	F	August.	16 20	26	14	51	22	40	26	14	37 22 38
xix. 16.	27	G		16 22	27	15	48	22	46	27	15	35 22 45
	28	A		16 24	28	16	45	22	51	28	16	32 22 51
	29	B		16 26	29	17	43	22	57	29	17	29 22 56
8. viiij.	30	C		16 27	30	18	40	23	2	30	18	26 23 1
xvj. 6.	31	D		16 28	31	19	37	23	7	31	19	23 23 6

North Declination.

of the Sunne.

☉ in ♈, third yeare					☉ in ♉, Leap-yere				
M.	D.	M.	D.	M.		D.	M.	D.	M.
1	20	27	17	56	1	21	31	18	17
2	21	25	18	11	2	22	1	18	22
3	22	23	18	26	3	23	27	18	37
4	23	20	18	41	4	24	4	18	51
5	24	18	18	55	5	25	2	19	5
6	25	16	19	9	6	25	59	19	19
7	26	13	19	23	7	26	56	19	32
8	27	11	19	36	8	27	54	19	45
9	28	8	19	49	9	28	52	19	58
10	29	6	20	2	10	29	49	20	11
11	♊	3	20	16	11	♊	47	20	23
12	1	1	20	26	12	1	44	20	35
13	1	58	20	38	13	2	42	20	47
14	2	56	20	49	14	3	39	20	58
15	3	54	21	0	15	4	37	21	8
16	4	50	21	11	16	5	34	21	19
17	5	48	21	21	17	6	31	21	29
18	6	45	21	31	18	7	29	21	38
19	7	42	21	40	19	8	26	21	47
20	8	40	21	49	20	9	23	21	56
21	9	37	21	58	21	10	21	22	5
22	10	34	22	7	22	11	18	22	13
23	11	32	22	15	23	12	15	22	21
24	12	29	22	23	24	13	12	22	28
25	13	26	22	30	25	14	10	22	35
26	14	23	22	36	26	15	7	22	42
27	15	21	22	43	27	16	4	22	48
28	16	18	22	49	28	17	1	22	53
29	17	15	22	54	29	17	58	22	59
30	18	12	23	0	30	18	56	23	4
31	19	10	23	5	31	19	53	23	8

North Declination.

mon yeare, and in the Leap-yeare, February hath 29 dayes,

To find the Sunnes place,

THe 10 of October, 1632 at Rome, that is the 9 day compleate, I desire to know the Sunns true place, the Epocha or rote of these Tables is for the yeare 1637 compleate, which I first set downe, the meane Longitude is 9 Signes 29 degr. and 9895 parts, which I set by it selfe, and the Apogei is 3 Signes 4 degr. and 3689 parts, which I set also by it selfe, and looke in the Table of months, where for September compleate is 8 Signes 9 Degrees, and 0817 parts, for the meane Longitude which I set under the former, and against 9 dayes compleate is 8 deg. 8708 parts, these three I adde together, the summe is (subtracting 12 Signes) 6 Signes twenty six degr. and 9420 parts, which I keepe, and looke in the Table of Moneths, for the Apogee of September compleat, which is twenty 8 parts, which added to the former is three

The Prime				Leng. of the Day. H. M.	True Place and Declination. First yere after Leap yeare, ☉ in ♊.	D. M.	D. M.	☉ in ♊, second yere	D. M.	D. M.
	1	E		16 28	1	20 34	23 11	1	20 20	23 10
8. v.	2	F		16 28	2	21 31	23 15	2	21 18	23 14
1. xiij.	3	G		16 29	3	22 28	23 19	3	22 15	23 18
7. ij.	4	A		16 29	4	23 26	23 22	4	23 12	23 21
x. 19.	5	B	Boniface	16 29	5	24 23	23 24	5	24 9	23 24
	6	C		16 29	6	25 20	23 26	6	25 6	23 26
xviij. 6.	7	D		16 30	7	26 17	23 28	7	26 4	23 28
	8	E		16 30	8	27 14	23 30	8	27 0	23 29
vij. 8.	9	F		16 30	9	28 11	23 31	9	27 58	23 30
	10	G		16 30	10	29 8	23 31	10	28 55	23 31
9. xv.	11	A	Barnaby.	16 30	11	[illegible] 5	23 31	11	29 52	23 31
11. iiij.	12	B		16 30	12	1 3	23 31	12	[illegible] 49	23 31
iij. 10.	13	C		16 30	13	2 0	23 30	13	1 46	23 31
	14	D		16 30	14	2 57	23 29	14	2 43	23 30
	15	E		16 30	15	3 54	23 28	15	3 40	23 29
9. j.	16	F		16 30	16	4 51	23 26	16	4 37	23 27
ix. 9.	17	G		16 29	17	5 48	23 24	17	5 34	23 24
	18	A		16 29	18	6 45	23 21	18	6 31	23 22
xvij. 2.	19	B		16 28	19	7 42	23 18	19	7 29	23 19
8. vj.	20	C	Edward.	16 27	20	8 39	23 14	20	8 26	23 15
xiiij.	21	D		16 26	21	9 37	23 10	21	9 23	23 11
iij. 11.	22	E		16 25	22	10 34	23 6	22	10 20	23 7
	23	F	Fast	16 24	23	11 31	23 1	23	11 17	23 3
xj. 3.	24	G	Iohn Bap	16 23	24	12 28	22 56	24	12 14	22 58
	25	A		16 22	25	13 25	22 50	25	13 11	22 52
3. xix.	26	B		16 20	26	14 22	22 44	26	14 8	22 46
	27	C		16 18	27	15 19	22 38	27	15 5	22 40
xiij. 4.	28	D		16 16	28	16 16	22 31	28	16 3	22 24
	29	E	Fast	16 14	29	17 13	22 24	29	17 0	22 27
8. xvj.	30	F	St. Peter.	16 13	30	18 10	22 17	30	17 57	22 19

North Declination.

of the Sunne.

	☉ in ♊, third yeare		☉ in ♊, Leap yere	
	D. M.	D. M.	D. M.	D. M.
1	20 7	23 9	1 20 50	23 12
2	21 4	23 13	2 21 47	23 16
3	22 1	23 17	3 22 44	23 20
4	22 58	23 20	4 23 41	23 23
5	23 55	23 23	5 24 39	23 25
6	24 52	23 25	6 25 36	23 27
7	25 50	23 27	7 26 33	23 29
8	26 47	23 29	8 27 28	23 30
9	27 44	23 30	9 28 27	23 31
10	28 41	23 31	10 29 24	23 31
11	29 38	23 31	11 ♋ 21	23 31
12	♋ 35	23 31	12 1 18	23 31
13	1 32	23 31	13 2 16	23 30
14	2 29	23 30	14 3 13	23 29
15	3 26	23 29	15 4 10	23 27
16	4 24	23 27	16 5 7	23 25
17	5 21	23 25	17 6 4	23 23
18	6 18	23 22	18 7 1	23 20
19	7 15	23 19	19 7 58	23 17
20	8 12	23 16	20 8 55	23 14
21	9 9	23 12	21 9 52	23 10
22	10 6	23 8	22 10 49	23 6
23	11 3	23 3	23 11 46	23 1
24	12 0	22 58	24 12 44	22 55
25	12 57	22 53	25 13 41	22 49
26	13 54	22 47	26 14 38	22 43
27	14 52	22 41	27 15 35	22 37
28	15 49	22 35	28 16 32	22 30
29	16 46	22 28	29 17 29	22 23
30	17 43	22 21	30 18 26	22 15

North Declination.

Sines 6 degrees 3817 parts, which I subtract from the meane Longitude, and the remainer is three Sines, 22 degrees and 5603 parts, of which I take halfe, and it is 56 degr. and 2801 parts, to bring these parts into Min. multiply them by 6, and cut off 3 figures to ye right hand, and the rest shall be Minuts, so it will be 56 degr. 17 min. which I seeke the Tangent of in Pitiscus, or any other that hath naturall tangents, which Tangent is 149849. which I multiply alwayes by 96464. when the meane Longitude (after the Apogæis subtracted) is between two Sines and 4 Sines, or betweén 8 Sines and 10 Sines, and the product is (cutting of 5 places to the right hand) a Tangent which I séeke in the Tangents, and find it neerest at 55 degr. 19 min. which double, and the summe is 110 degr. 38 min. which I adde to 96 degr. 22 min. the Apogæi and the whole is 207 degr. 00 min. which divided by 30, will be 6 Sines and 27 degr. 00 min. that is, 27 degr. 00 min. in Libra, the Sunnes true place the 10 of October 1638, at Noone.

The Letters			Leng. of the Day.	True Place and Declination. First yere after Leap yeare, ☉ in ♌.				☉ in ♍, second yere			
			H. M.	L.	D. M.	D.	M.		D. M.	D.	M.
2. v.	1	G	Vincula.	16	12	1	19	8	22	19	1	18	54	22	11
xiij. 8.	2	A	of Mary.	16	10	2	20	5	22	1	2	19	51	22	3
ij. 7.	3	B	Martin.	16	8	3	21	2	21	52	3	20	48	21	55
x.	4	C		16	6	4	21	59	21	43	4	21	45	21	46
	5	D		16	4	5	22	56	21	34	5	22	43	21	30
	6	E		16	1	6	23	54	21	24	6	23	40	21	27
4. xviij.	7	F		15	57	7	24	51	21	14	7	24	37	21	17
	8	G		15	54	8	25	48	21	4	8	25	34	21	6
9. vij.	9	A		15	51	9	26	45	20	53	9	26	31	20	56
xv.	10	B		15	48	10	27	42	20	42	10	27	29	20	45
iiij. 8.	11	C		15	46	11	28	40	20	30	11	28	26	20	35
	12	D		15	44	12	29	37	20	18	12	29	23	20	22
3. xij.	13	E		15	41	13	♎	34	20	6	13	♎	20	20	9
	14	F		15	38	14	1	31	19	54	14	1	18	19	57
j. 6.	15	G	Swithin.	15	35	15	2	29	19	41	15	2	15	19	44
	16	A		15	32	16	3	26	19	28	16	3	12	19	31
2. ix.	17	B		15	29	17	4	23	19	24	17	4	9	19	17
xvij. 10.	18	C		15	26	18	5	20	19	0	18	5	7	19	3
vj.	19	D	Dog da. b	15	23	19	6	18	18	46	19	6	4	18	49
xiiij. 8.	20	E	Margret.	15	20	20	7	15	18	32	20	7	2	18	35
	21	F		15	17	21	8	13	18	17	21	7	59	18	20
iij.	22	G	Magdal.	15	13	22	9	10	18	2	22	8	56	18	5
	23	A		15	10	23	10	7	17	46	23	9	54	17	50
6. xj.	24	B	Fast	15	8	24	11	5	17	30	24	10	51	17	34
xix. 11.	25	C	St. Iames	15	5	25	12	2	17	15	25	11	49	17	18
	26	D	Anna.	15	3	26	13	0	16	59	26	12	46	17	2
	27	E		15	0	27	13	57	16	42	27	13	44	16	46
9. viij.	28	F		14	57	28	14	55	16	25	28	14	41	16	29
xvj.	29	G		14	55	29	15	53	16	8	29	15	39	16	12
v. 7.	30	A		14	52	30	16	52	15	51	30	16	36	15	55
	31	B		14	50	31	17	58	15	34	31	17	34	15	38

North Declination

of the Sunne.

	☉ in ♑ third yeare		☉ in ♑ Leap yere	
	D.	M.	D.	M.
1	18	40	22	13
2	19	37	22	5
3	20	34	21	57
4	21	32	21	48
5	22	29	21	38
6	23	26	21	29
7	24	23	21	19
8	25	20	21	9
9	26	18	20	58
10	27	15	20	47
11	28	12	20	36
12	29	9	20	24
13	♌	6	20	12
14	1	4	29	0
15	2	1	19	47
16	2	58	19	34
17	3	56	19	21
18	4	53	19	7
19	5	50	18	53
20	6	48	18	39
21	7	45	18	23
22	8	42	18	9
23	9	40	17	54
24	10	37	17	39
25	11	35	17	23
26	12	32	17	6
27	13	29	16	50
28	14	27	16	33
29	15	25	16	16
30	16	22	15	59
31	17	20	15	42

North Declination.

	☉ in ♑ third yeare		☉ in ♑ Leap yere	
	D.	M.	D.	M.
1	19	23	22	7
2	20	21	21	59
3	21	18	21	50
4	22	15	21	41
5	23	12	21	31
6	24	9	21	22
7	25	6	21	12
8	26	4	21	1
9	27	1	20	50
10	27	58	20	39
11	28	55	20	27
12	29	53	20	15
13	♌	50	20	3
14	1	47	19	51
15	2	44	19	38
16	3	43	19	24
17	4	39	19	11
18	5	36	18	57
19	6	33	18	43
20	7	31	18	28
21	8	29	18	13
22	9	26	17	58
23	10	23	17	43
24	11	21	17	27
25	12	18	17	11
26	13	16	16	55
27	14	13	16	38
28	15	11	16	21
29	16	8	16	4
30	17	6	15	47
31	18	4	15	29

Note when the Sunnes meane Longitude (after the Apogæi is subtracted) is betweene 4 Signes and 8 Signes, or betweene 10 Signes and two Signes in stead of 96464. you must take 96476. to multiply your Tangent by.

Example.

I would know the Suns true place the 7 of May, 1638 at Noone, I take out the meane Longitude, and Apógæi for 1637 compleat, as before, and I take the meane Longitude for Aprill compleate, which is 3 Signes 28 degr. and 1775 parts, and for 6 dayes compleat it is 5 degrees and 9139 parts. The whole summe is 13 Signes 25 degrees and 1809 parts, the Apogæi for Aprill compleat is 55 parts; which added to the Apogæi for 1637, the summe is 3 Signes 6 deg. and 3744 parts, which subtracted from the meane Longitude, the remainer is 10 Signes 18 degr. and 8065 parts; now because it is more then 6 Signes, I subtract from it 6 Signes 00 deg. 00333 parts (which I must alwayes doe, when the remainer

The Prime.				Leng. of the Day.	True Place and Declination. First yere after Leap yere, ☉ in ♌				☉ in ♎, second yere			
				H. M.	D. M.		D. M.			D. M.		D. M.
6. xiij.	1	C	Lammas	14 46	1	18 45	15 16	North Declination.	1	18 31	15 20	North Declination.
2. ij.	2	D		14 42	2	19 43	14 58		2	19 29	15 2	
	3	E		14 38	3	20 41	14 39		3	20 27	14 24	
7. x.	4	F		14 34	4	21 38	14 21		4	21 24	14 25	
xviij. 9.	5	G		14 30	5	22 36	14 1		5	22 22	14 7	
	6	A		14 26	6	23 34	13 34		6	23 20	13 48	
vij.	7	B		14 22	7	24 31	13 24		7	24 18	13 29	
xv. 7.	8	C		14 18	8	25 29	13 4		8	25 15	13 9	
	9	D		14 15	9	26 27	12 45		9	26 13	12 50	
5. iiij.	10	E	Lawrenc	14 12	10	27 25	12 25		10	27 11	12 30	
xij. 11.	11	F		14 9	11	28 23	12 5		11	28 9	12 10	
	12	G		14 6	12	29 21	11 45		12	29 7	11 50	
	13	A		14 3	13	♍ 18	11 25		13	♍ 5	11 30	
3. j.	14	B		14 0	14	1 16	11 4		14	1 2	11 9	
xj. 12.	15	C		13 56	15	2 14	10 43		15	2 0	10 48	
	16	D		13 52	16	3 12	10 22		16	2 58	10 27	
vj. 7. xvij	17	E		13 50	17	4 10	10 10		17	3 56	10 6	
	19	F		13 44	18	5 8	9 40	South Declination.	18	4 55	9 45	South Declination.
9. xiiij.	18	G		13 40	19	6 7	9 18		19	5 53	9 14	
	20	A		13 35	20	7 5	8 57		20	6 51	9 2	
8. iij.	21	P.		13 30	21	8 3	8 35		21	7 49	8 40	
xj. 9.	22	C		13 25	22	9 1	8 13		22	8 47	8 18	
	23	D	Fast	13 20	23	9 59	7 51		23	9 45	7 56	
xiz. 4.	24	E	Bart hol.	13 15	24	10 57	7 29		24	10 43	7 34	
	25	F	Apostle.	13 10	25	11 55	7 7		25	11 42	7 12	
viij.	26	G		13 6	26	12 54	6 45		26	12 40	6 50	
xvj. 8.	27	A		13 2	27	13 52	6 22		27	13 38	6 28	
	28	B		12 58	28	14 50	6 0		28	14 37	6 5	
7. v.	29	C	Behead.	12 54	29	15 49	5 37		29	15 35	5 42	
xiij. 5.	30	D	of John.	12 51	30	16 47	5 14		30	16 33	5 20	
	31	E		12 48	31	17 46	4 51		31	17 32	4 57	

4. 51.

of the Sunne.

	☉ in ♌ third yeare		☉ in ♌ Leap-yere	
	D. M.	D. M.	D. M.	D. M.
1	18 17	15 24	19 1	15 11
2	19 15	15 6	19 59	14 53
3	20 13	14 48	20 56	14 35
4	21 10	14 30	21 54	14 16
5	22 8	14 11	22 52	13 57
6	23 6	13 52	23 50	13 38
7	24 4	13 33	24 47	13 19
8	25 1	13 14	25 45	13 0
9	25 59	12 55	26 43	12 40
10	26 56	12 35	27 41	12 20
11	27 54	12 15	28 39	12 0
12	28 53	11 55	29 36	11 40
13	29 50	11 34	♍ 34	11 19
14	♍ 48	11 14	1 32	10 58
15	1 46	10 53	2 30	10 38
16	2 44	10 32	3 28	10 17
17	3 42	10 11	4 26	9 56
18	4 40	9 50	5 24	9 34
19	5 38	9 20	6 23	9 33
20	6 37	9 7	7 21	8 51
21	7 35	8 46	8 19	8 10
22	8 33	8 24	9 17	8 8
23	9 31	8 2	10 15	7 46
24	10 29	7 40	11 13	7 24
25	11 27	7 18	12 12	7 1
26	12 26	6 55	13 10	6 39
27	13 24	6 33	14 8	6 17
28	14 22	6 10	15 [illegible]	5 54
29	15 21	5 48	16 [illegible]	5 31
30	16 19	5 25	17 [illegible]	5 09
31	17 18	5 2	18 [illegible]	4 46

North Declination.

mainer is more then five Sines) and the rest is 4 fiues 18 degrees and 7732 parts, the halfe whereof is 69 degrees and 3866 parts, that is 69 degrees and 23 minutes: the Complement whereof is 20 degrees 37 minutes, whose Tangent is 37260, which I multiply by 96476, because the meane Longitude is betweene ten Sines and two fines, as is before noted after the Apogæi is subtracted, and the Product is (cutting off five figures to the right hand) 36294. the Tangent of 19 degrees and 57 minutes, the Complement whereof is 70 degrees 3 minutes, which being doubled is 140 degr. 6 minuts unto which I adde the 6 Sines that was subtracted, viz. 180 degrees 0 min. and also 96 degrees 22 minutes the Apogæi, the whole summe is 416 degrees 28 minutes: from which I subtract a whole Circle 360 degrees 0 min. and the remainer is 56 degrees 28 minutes, the Sunnes place from the beginning of Aries, that is, 26 degrees 28 min. in Taurus, the 7 of May, 1638 at Rome.

The Prime				Leng. of the Day.	True Place and Declination. First yere after Leap yeare, ☉ in ♎.				☉ in ♎, second yere			
				H.M.	D.	M.	D.	M.		D.	M.	D. M.
12. ij.	1	F	Giles.	12 48	1	18	44	4 26	1	18	30	4 34
x. 8.	2	G		12 44	2	19	43	4 5	2	19	29	4 11
	3	A		12 40	3	20	41	3 42	3	20	27	3 48
3. xviij.	4	B		12 36	4	21	40	3 19	4	21	26	3 24
vij. 7.	5	C	Dog dai.	12 32	5	22	38	2 56	5	22	25	3 1
	6	D	end.	12 28	6	23	37	2 33	6	23	23	2 38
9. xv.	7	E	Nat. Eliz	12 24	7	24	36	2 9	7	24	22	2 15
iiij. 9.	8	F	Na. Mar.	12 20	8	25	35	1 45	8	25	21	1 51
	9	G		12 16	9	26	34	1 22	9	26	19	1 28
xij. 2.	10	A		12 12	10	27	32	0 59	10	27	18	1 5
	11	B		12 8	11	28	31	0 36	11	28	17	0 41
j. 11.	12	C		12 4	12	29	30	0 12	12	29	16	0 18
	13	D		11 0	13	♎	29	0 12	13	♎	15	0 6
2. ix.	14	E	Holy Cro	11 56	14	1	28	0 35	14	1	14	0 29
xvij. 8.	15	F		11 52	15	2	27	0 59	15	2	13	0 53
8. vj.	16	G		11 48	16	3	26	1 23	16	3	12	1 17
xiiij. 2.	17	A	Lambert	11 44	17	4	25	1 45	17	4	11	1 40
	18	B		11 40	18	5	24	2 9	18	5	10	2 4
iij. 7.	19	C		11 36	19	6	23	2 33	19	6	9	2 27
	20	D	Fast	11 32	20	7	22	2 56	20	7	8	2 50
xj. 2.	21	E	St. Mach.	11 28	21	8	22	3 19	21	8	7	3 14
	22	F		11 24	22	9	21	3 43	22	9	7	3 37
5. xix.	23	G		11 20	23	10	20	4 6	23	10	6	4 1
viij. 9.	24	A		11 16	24	11	20	4 29	24	11	5	4 24
	25	B	Cyprian.	11 12	25	12	19	4 53	25	12	5	4 47
8. xvj.	26	C		11 8	26	13	18	5 16	26	13	4	5 11
v. 5.	27	D		11 4	27	14	17	5 36	27	14	3	5 34
	28	E	Fast	11 0	28	15	17	6 3	28	15	3	5 57
4. xiij.	29	F	S. Micha.	10 56	29	16	17	6 26	29	16	2	6 20
ij. 6.	30	G	Hierome	10 52	30	17	16	6 49	30	17	2	6 43

North Declination. South Declination.

of the Sunne.

☉ in ♍, third yeare			☉ in ♍, Leap-yeare		
	D. M.	D. M.		D. M.	D. M.
1	18 16	4 39	1	19 1	4 23
2	19 15	4 16	2	19 59	4 0
3	20 13	3 53	3	20 58	3 37
4	21 12	3 30	4	21 56	3 13
5	22 10	3 7	5	22 55	2 50
6	23 9	2 44	6	23 54	2 27
7	24 8	2 21	7	24 52	2 4
8	25 6	1 57	8	25 51	1 40
9	26 5	1 34	9	26 50	1 17
10	27 4	1 10	10	27 49	0 53
11	28 3	0 47	11	28 47	0 30
12	29 2	0 23	12	29 46	0 6
13	♎ 1	0 0	13	♎ 45	0 17
14	1 59	0 24	14	1 44	0 41
15	1 58	0 47	15	2 43	1 4
16	2 57	1 11	16	3 42	1 28
17	3 57	1 34	17	4 41	1 51
18	4 56	1 58	18	5 40	2 15
19	5 55	2 21	19	6 40	2 39
20	6 54	2 45	20	7 39	3 2
21	7 53	3 8	21	8 38	3 25
22	8 52	3 31	22	9 37	3 49
23	9 52	3 55	23	10 36	4 12
24	10 51	4 19	24	11 36	4 36
25	11 50	4 42	25	12 35	4 59
26	12 50	5 5	26	13 35	5 22
27	13 49	5 28	27	14 34	5 45
28	14 48	5 52	28	15 33	6 8
29	15 48	6 15	29	16 33	6 31
30	16 47	6 38	30	17 32	6 54

North Declination. South Declination.

If any man be pleased to worke this by the Logarithme Tangents, I have here therefore put the Logarithmes of those common numbers before set downe, viz. 96464, whose logarithme is 99843654 and the Logarithme of 96476, is the Logarithme of 99844220. I have put downe this easie way of finding the Sunnes place for their sakes that have occasion to use the Declination at Sea, which will serve in after time to find the Suns declination by the place (as is shewed by the first Astronomicall proposition by the Table of Signes,) when the Tables of Declination in this Booke shall need correction, although it find not the place to seconds, yet it differs not one minute, which cannot breed any Errour at all in the Suns declination at any time; and therefore I expect a charitable censure concerning it.

Another Example.

I desire to know the Sunnes place the 19. of May 1653. at 8 of the clocke in

The Prime				Leng. of the Day.	True Place and Declination. First yere after Leap yere, ☉ in ♎.				☉ in ♎, second yere			
				H.M.	D.M.		D.M.		D.M.		D.M.	
	1	A		10 48	1	18 16	7	12	1	18 1	7	6
2. x.	2	B		10 44	2	19 15	7	34	2	19 1		29
xviij. 10.	3	C		10 40	3	20 15	7	57	3	20 1	7	51
	4	D		10 36	4	21 15	8	19	4	21 0	8	14
8. vij.	5	E		10 32	5	22 14	8	42	5	22 0	8	36
xv.	6	F	Faith.	10 28	6	23 14	9	4	6	23 0	8	59
	7	G		10 24	7	24 14	9	26	7	23 59	9	21
iiij. 1.	8	A		10 20	8	25 14	9	48	8	24 59	9	43
	9	B	Denis.	10 16	9	26 14	10	10	9	25 59	10	5
4. xij.	10	C		10 12	10	27 13	10	32	10	26 59	10	26
	11	D		10 8	11	28 13	10	53	11	27 59	10	48
j.	12	E		10 4	12	29 13	11	15	12	28 59	11	10
ix. 16.	13	F	Edward.	10 0	13	♏ 13	11	36	13	29 59	11	32
xvij. 17.	14	G		9 56	14	1 13	11	57	14	♏ 59	11	51
vj. 5.	15	A		9 52	15	2 14	12	18	15	1 59	12	13
	16	B		9 48	16	3 14	12	39	16	2 59	12	33
8. xiiij.	17	C	Fast	9 44	17	4 14	12	59	17	3 59	12	54
	18	D	St. Luke.	9 40	18	5 14	13	19	18	4 59	13	15
iij.	19	E		9 36	19	6 14	13	39	19	6 0	13	35
	20	F		9 32	20	7 14	13	59	20	7 0	13	54
6. xj.	21	G		9 28	21	8 15	14	19	21	8 0	14	14
xix. 8.	22	A		9 24	22	9 15	14	38	22	9 0	14	34
	23	B		9 20	23	10 15	14	57	23	10 1	14	53
7. viij.	24	C		9 17	24	11 16	15	16	24	11 1	15	12
xvj. 2.	25	D	Crispin.	9 14	25	12 16	15	35	25	12 1	15	30
	26	E		9 10	26	13 16	15	53	26	13 2	15	49
4. v.	27	F	Fast	9 7	27	14 17	16	11	27	14 2	16	7
	28	G	Simon &	9 4	28	15 17	16	29	28	15 3	16	25
xij. xiij.	29	A	Jude.	9 0	29	16 18	16	47	29	16 3	16	43
ij.	30	B		8 56	30	17 19	17	4	30	17 4	17	0
xiij.	31	C		8 52	31	18 19	17	21	31	18 4	17	17

South Declination.

of the Sunne.

☉ in ♎, third yeare					☉ in ♎, Leap-yere				
	D.	M.	D.	M.		D.	M.	D.	M.
1	17	47	7	0	1	18	31	7	17
2	18	46	7	23	2	19	32	7	40
3	19	46	7	46	3	20	31	8	2
4	20	46	8	8	4	21	31	8	25
5	21	45	8	31	5	22	31	8	47
6	22	45	8	53	6	23	30	9	9
7	23	45	9	15	7	24	30	9	31
8	24	45	9	37	8	25	30	9	53
9	25	45	9	59	9	26	30	10	15
10	26	44	10	21	10	27	30	10	37
11	27	44	10	43	11	28	30	10	58
12	28	44	11	4	12	29	30	11	20
13	29	44	11	26	13	♏	30	11	41
14	♏	44	11	47	14	1	30	12	2
15	1	44	12	8	15	2	30	12	23
16	2	44	12	28	16	3	30	12	44
17	3	45	12	49	17	4	30	13	4
18	4	45	13	9	18	5	30	13	24
19	5	45	13	30	19	6	31	13	44
20	6	45	13	50	20	7	31	14	4
21	7	45	14	9	21	8	31	14	23
22	8	45	14	29	22	9	31	14	43
23	9	46	14	48	23	10	31	15	2
24	10	46	15	7	24	11	32	15	21
25	11	47	15	26	25	12	33	15	39
26	12	47	15	45	26	13	33	15	58
27	13	48	16	3	27	14	34	16	16
28	14	48	16	21	28	15	34	16	34
29	15	49	16	39	29	16	34	16	51
30	16	49	16	56	30	17	35	17	8
31	17	50	17	13	31	18	36	17	25

South Declination.

the fore-noone, that must be as is before noted the 17 day 20 houres afternoone; first subtract 1637 out of 1652, and the remainer is 15 yeares, then I adde the equall motions of 1637, and 15 yeares, 4 moneths 17 dayes and 20 houres, and the Apogæi of 1637, and of 15 yeares, and of Aprill compleat; and subtract one out of the other. the difference is 11 Sines 0 degr. and 5750 parts, from which I subtract 6 Sines 0 degrées 0333 parts as is before noted, and the rest is 5. Sines 00 degrées and 5417 parts, that is. 150 degrées, 5417 parts or 150 degrées 32 min. the halfe whereof is 75 degrées 16 min. the complement is 14 degr. 44 minutes, whose Tangent is 26296, which multiplyed by 96476, (because the meane Longitude is betwéene 10 Sines and 2 sines, as is before noted) the Product is (cutting off five figures to the right hand) 25369, which is the Tangent of 14 degr. 14 min. whose Complement is 75 degr. 46 min. the double 151 degr. 32 min. unto which I adde 180 degr. 00 min. and

The Prime				Leng. of the Day	True Place and Declination: First yere after Leap yere, ☉ in ♏			South Declination.	☉ in ♏, second yere		
				H.M.		D.M.	D.M.			D.M.	D.M.
	1	D	All Saint	8 4	1	19 20	17 38		1	19 5	17 34
5. xviij.	2	E		8 40	2	20 20	17 54		2	20 6	17 50
vij. 3.	3	F		8 43	3	21 21	18 10		3	21 6	18 6
	4	G		8 40	4	22 22	18 26		4	22 7	18 22
11. xv.	5	A	Powd. Tr	8 37	5	23 22	18 41		5	23 8	18 38
	6	B	Leonard.	8 34	6	24 23	18 56		6	24 8	18 53
5. iiij.	7	C		8 31	7	25 24	19 11		7	25 9	19 8
11. xij.	8	D		8 28	8	26 25	19 26		8	26 10	19 22
	9	E		8 22	9	27 26	19 40		9	27 11	19 7
j. 12.	10	F		8 25	10	28 26	19 53		10	28 12	19 51
	11	G	S. Martin	8 19	11	29 27	20 7		11	29 13	20 4
2. ix.	12	A		8 16	12	♐ 28	20 20		12	♐ 13	20 17
xvij. 4.	13	B		8 13	13	1 29	20 33		13	1 14	20 29
8. vj.	14	C		8 10	14	2 30	20 45		14	2 15	20 41
xiiij. 8.	15	D		8 7	15	3 31	20 56		15	3 16	20 53
	16	E		8 4	16	4 32	21 8		16	4 17	21 5
	17	F	Hugh	8 2	17	5 33	21 19		17	5 18	21 16
5. iij.	18	G		8 0	18	6 34	21 29		18	6 19	21 27
xj. 9.	19	A		7 57	19	7 35	21 39		19	7 20	21 37
	20	B	Edmund	7 54	20	8 36	21 49		20	8 21	21 47
4. xix.	21	C		7 51	21	9 37	21 58		21	9 22	21 56
viij. 5.	22	D	Cicily.	7 49	22	10 38	22 7		22	10 24	22 5
	23	E	Clement	7 47	23	11 40	22 16		23	11 25	22 14
11. xvj.	24	F		7 45	24	12 41	22 24		24	12 26	22 22
	25	G	Katherin	7 43	25	13 42	22 32		25	13 27	22 30
10. v.	26	A		7 40	26	14 43	22 39		26	14 28	22 37
xiij. 8.	27	B		7 38	27	15 44	22 46		27	15 29	22 44
	28	C		7 37	28	16 45	22 52		28	16 31	22 50
ij. 12.	29	D	Fast	7 36	29	17 46	22 58		29	17 32	22 57
7. x.	30	E	S. Andrew.	7 36	30	18 47	23 3		30	18 33	23 1

of the Sunne.

	☉ in ♏, third yeare		☉ in ♏, Leap yere		
	D.	M.	D.	M.	
1	18	50	17	30	
2	19	51	17	45	
3	20	52	18	2	
4	21	52	18	18	
5	22	53	18	33	
6	23	54	18	47	
7	24	54	19	4	
8	25	55	19	19	
9	26	56	19	33	
10	27	57	19	47	
11	28	58	20	0	
12	29	59	20	13	
13	♐	0	20	26	
14	2	1	20	39	
15	3	2	20	51	
16	4	3	21	2	
17	5	4	21	13	
18	6	5	21	24	
19	7	6	21	34	
20	8	7	21	44	
21	9	8	21	54	
22	10	9	22	3	
23	11	10	22	12	
24	12	11	22	20	
25	13	12	22	28	
26	14	13	22	35	
27	15	15	22	42	
28	16	16	22	49	
29	17	17	22	55	
30	18	18	23	1	

South Declination.

	☉ in ♏, Leap yere			
	D.	M	D.	M.
1	19	35	17	41
2	20	37	17	58
3	21	38	18	14
4	22	38	18	30
5	23	39	8	45
6	24	40	19	0
7	25	41	19	15
8	26	41	19	29
9	27	42	19	43
10	28	43	19	57
11	29	44	20	10
12	♐	45	20	23
13	1	46	20	35
14	2	47	20	47
15	3	48	20	59
16	4	49	21	10
17	5	50	21	21
18	6	51	21	31
19	7	52	21	41
20	8	53	21	51
21	9	54	22	1
22	10	55	22	10
23	11	56	22	18
24	12	57	22	26
25	13	59	22	34
26	15	0	22	41
27	15	1	22	48
28	16	2	22	54
29	17	3	23	0
30	18	4	23	5

the Apogæi 96 Degrées 38 minuts, and from the summe subtract 350 degrées 00 min. the remainer is 68 degrées 10 minutes from the beginning of Aries, that is 8 degrées 10 minutes in Gemini, the Sunnes true place for the time given the 19 of May 1653, at 8 of the clocke in the fore-noone. after these 20 single yeares are past, you may adde the meane Longitude and Apogæi of 1639, and so make a new Epochæ or rote for 1657, and so goe on with the 20 yeares againe, untill you come to 1678, and then againe make a new Epochæ or Rote, and so at the end of every 20 yeares.

				Leng. of the Day.	True Place and Declination.									
					First yere after Leap yeare, ⊙ in ♐.					⊙ in ♑, second yere				
				H.M.		D.	M.	D.	M.		D.	M.	D.	M.
xviij. 5.	1	F		7 34	1	19	49	23	8	1	19	34	23	6
	2	G		7 33	2	20	50	23	12	2	20	35	23	11
9. viij.	3	A		7 32	3	21	52	23	16	3	21	37	23	15
xv. 4.	4	B		7 31	4	22	53	23	20	4	22	38	23	19
	5	C		7 30	5	23	54	23	23	5	23	39	23	22
	6	D		7 30	6	24	55	23	26	6	24	41	23	25
10. iiij.	7	E		7 30	7	25	57	23	28	7	25	42	23	27
xij. 7.	8	F	Con. Ma.	7 30	8	26	58	23	29	8	26	43	23	29
	9	G		7 30	9	27	59	23	30	9	27	45	23	30
2. j.	10	A		7 30	10	29	1	23	31	10	28	46	23	31
ix. 7.	11	B		7 30	11	♑	2	23	31	11	29	47	23	31
xvij. 15.	12	C	Lucie.	7 30	12	1	3	23	31	12	♑	48	23	31
vj. 9.	13	D		7 30	13	2	5	23	30	13	1	50	23	31
	14	E		7 31	14	3	6	23	29	14	2	51	23	30
xiiij. 3.	15	F		7 32	15	4	7	23	27	15	3	52	23	28
	16	G		7 33	16	5	9	23	25	16	4	54	23	25
iij. 11.	17	A		7 34	17	6	10	23	23	17	5	55	23	23
	18	B		7 35	18	7	11	23	20	18	6	57	23	20
xj.	19	C		7 36	19	8	13	23	16	19	7	58	23	17
xix. 8.	20	D	Fast	7 37	20	9	14	23	12	20	8	59	23	13
	21	E	S. Thom.	7 38	21	10	15	23	7	21	10	1	23	9
8. viij.	22	F		7 39	22	11	17	23	3	22	11	2	23	2
xvj. 3.	23	G		7 40	23	12	18	22	57	23	12	3	22	58
	24	A		7 41	24	13	19	22	51	24	13	4	22	54
v. 10.	25	B	Christm.	7 42	25	14	21	22	44	25	14	6	22	46
	26	C	S. Steph.	7 43	26	15	22	22	38	26	15	7	22	40
xiij. 3.	27	D	S. John.	7 44	27	16	23	22	31	27	16	8	22	33
ij. 1.	28	E	Innocent	7 46	28	17	25	22	32	28	17	10	22	25
x. 9.	29	F		7 48	29	18	26	22	15	29	18	11	22	17
	30	G		7 49	30	19	27	22	6	30	19	12	22	9
7. xviij.	31	A		7 50	31	20	28	21	57	31	20	14	21	0

South Declination.

December.

of the Sunne.

☉ in ♐, third yere	D.	M.	D.	M.	☉ in ♐, Leap yere	D.	M.	D.	M.
1	19	19	23	6	1	20	6	23	6
2	20	21	23	11	2	21	7	23	14
3	21	22	23	15	3	22	8	23	18
4	22	23	23	18	4	23	10	23	21
5	23	24	23	21	5	24	11	23	24
6	24	26	23	24	6	25	12	23	27
7	25	27	23	26	7	26	13	23	29
8	26	28	23	28	8	27	15	23	30
9	27	30	23	30	9	28	16	23	31
10	28	31	23	31	10	29	17	23	31
11	29	32	23	31	11	♑	19	23	31
12	♑	34	23	31	12	1	20	23	31
13	1	35	23	31	13	2	21	23	30
14	2	36	23	30	14	3	23	23	29
15	3	38	23	29	15	4	24	23	27
16	4	39	23	27	16	5	25	23	25
17	5	40	23	24	17	6	27	23	22
18	6	42	23	21	18	7	28	23	19
19	7	43	23	18	19	8	29	23	15
20	8	44	23	14	20	9	31	23	11
21	9	46	23	9	21	10	32	23	6
22	10	47	23	5	22	11	33	23	1
23	11	48	23	0	23	12	35	22	56
24	12	50	22	54	24	13	36	22	50
25	13	51	22	48	25	14	37	22	43
26	14	52	22	41	26	15	39	22	36
27	15	53	22	34	27	16	40	22	29
28	16	55	22	27	28	17	41	22	21
29	17	56	22	19	29	18	43	22	13
30	18	57	22	10	30	19	44	22	4
31	19	59	22	1	31	20	45	21	55

South Declination.

	♈ ♎ D.	M.	♉ ♏ D.	M.	♊ ♐ D.	M.	
0	0	0	11	30	20	12	30
1	0	24	11	51	20	25	29
2	0	48	12	12	20	37	28
3	1	12	12	33	20	49	27
4	1	35	12	53	21	0	26
5	2	0	13	13	21	11	25
6	2	23	13	33	21	22	24
7	2	47	13	53	21	33	23
8	3	11	14	13	21	42	22
9	3	35	14	32	21	51	21
10	3	58	14	51	22	0	20
11	4	22	15	10	22	9	19
12	4	45	15	28	22	17	18
13	5	9	15	47	22	25	17
14	5	32	16	5	22	32	16
15	5	55	16	23	22	39	15
16	6	19	16	40	22	46	14
17	6	42	16	57	22	52	13
18	7	5	17	14	22	57	12
19	7	28	17	31	23	3	11
20	7	50	17	47	23	7	10
21	8	13	18	3	23	12	9
22	8	35	18	19	23	15	8
23	8	58	18	34	23	19	7
24	9	20	18	49	23	22	6
25	9	42	19	4	23	24	5
26	10	4	19	18	23	26	4
27	10	26	19	32	23	28	3
28	10	47	19	46	23	29	2
29	11	9	19	59	23	30	1
30	11	30	20	12	23	30	0
	♍ ♓		♌ ♒		♋ ♑		

This fore-going Table sheweth the Declination of the Sun upon every severall degree of the Ecliptick through all the foure quarters of the Zodiack: by which Table you may make tryall of the former Table of Declination, if you doubt of any part thereof, as followeth:

First, by the Kalender or Ephemerides next before, find out the Day of the moneth, for which you desire the Declination, and right against the same you shall have the Sine, Degree and Minute, which the Sunne possesseth in the Zodiack the Day aforesaid, with which Sine and Degree enter this Table, and marke whether your Sine be at the head of the Table or at the foot thereof; for if the Sine be at the head, then you must count the degree thereof downward, in the first Colume at the left hand of the Table, but if the Sine be at the foot of the Table, you must count the degree thereof upward, in the first Colume on the right hand: And in the common Angle, where the Characters of the Sine and Degree thereof meets, is the Degree and Minute of the Declination desired.

Example.

The 20.th of Aprill 1630. the place of the Sunne is 10 degrees of Taurus, I find Taurus in the head of the Table; therefore counting 10 degrees thereof downward in the first Colume on the left hand, right against 10, in the Colume where Taurus stands, is 14 degrees 51 minutes, which is the Declination of 10 degrees of Taurus, or if the Sun being in so many degr. of the same Sine. But if the place of the Sun have odde min. therewith you must take the difference of the nearest degree of Declination, and work by the proportionall parts of 60 minutes to a degree.

As for Example.

The 22 of August 1638. the true place of the Sunne is 8 degr. 47 minutes of Virgo, I find Virgo to be in the foot of the Table, therefore in the first Colume on the right hand. I count upward 8 degrees, and right against the same in the Colume where the Cha-

Character of Virgo is, I find 8 degr. 35 min. which is the Declination of 8 degr. of Virgo, but now there is the Declination of 27 minutes to be either added or deduced, as the Declination doth increase or decrease. To find which, I take the difference betwixt 8 degr. 35 min. the Declination of 8 deg. of Virgo, and 8 degr. 13 min. the declination of 9 deg. of Virgo, which is 22 min. Then I say, if 60 min. give 22 minutes, what gives 47 minuts, Facit 17 minutes nereſt: which because the Declination doth decreaſe, I deduct 17 minutes from 8 degrees 35 min. and the remainer is 8 degr. 18 min. for the true Declination of 8 degr. 27 min. of Virgo.

Againe, the 16 of Aprill 1638. the true place of the Sunne is 6 deg. 13 min. of Taurus. I find Taurus in the head of the Table, then counting 6 degr. downward in the firſt Columne on the left hand, right againſt the ſame under Taurus, is 13 degr. 33 minutes for the Declination of 6 degr. of Taurus: Then for the 13 min. I take the difference betwixt 13 deg. 33 min. and 13 deg. 53 min. the declination of 7 degr. of Taurus: which is 20 minutes. Then I ſay if 60 give 20, what gives 13 min. Facit 4 min. nereſt: which 4 min. I adde to 13 deg. 33 min. becauſe the Declination doth increaſe and it makes 13 degr. 37 minutes, for the true Declination of 6 degrees 38 min. of Taurus.

Theſe three Examples (to the ingenious) are as good as five hundreth.

The Diviſion, Parts, Order, and explanation of the former Almanack or Ephemerides

THe firſt Page of the ſaid Ephemerides, containes an Almanack for xxiiij yeares to come ſhewing the Prime, Epact, Sunday-letter, and Leap-yeare, with all the principall moveable Feaſts in the whole yeare. Next followes the twelve Moneths of the yeare in order, each Moneth containing two

Faces may be divided into two principall Sections: The first, Common, the second and third Astronomicall: the first being indéed the Common, because it is most needfull for all persons, consisteth of five Columes or spaces: The first whereof sheweth the space and houre of the Moones change for 19 yeares to come: the second, sheweth the Number of the Dayes in every Moneth: the third, the Letters ordinary for every day of the Week: the fourth the Holy-dayes and other dayes of note in each Moneth. Where note, that those that are observed for Holy-dayes, have this word Fast before them, and the fifth or last of the said first Section, sheweth the Length of the Day in houres and minutes, where the Pole is elevated 51 degrées 40 minutes.

The second Section, containeth foure principall Parts, each part consisting of three Columes, the foure parts being foure severall yeares, each fourth yeare being Leap-yeare, therein comprising the variety of the Sunnes course through the Zodiack in the said foure yeares. And the three spaces or Columes in each yeare: the first, is the Dayes of each moneth in the said yeare: the second, the true place of the Sunne answerable thereto: the third, the Declination or distance of the Sun from the Equinoctiall points of Aries and Libra, towards the Tropicall points of Cancer and Capricorn, answerable to each day of the moneth, and to the degrees and minutes of the Sun in the Zodiack.

The reason wherefore the said Table is made for foure yeares, and neither more nor lesse, is, because that every yeare is not of like equality of dayes one with another: For the first yeare hath 365 dayes and néere 6 houres: the second and third yeares being so likewise, but in the fourth yeare the odde houres are united together, which being 4 times 6, is 24 houres very neere, making a naturall Day, which day is added to the said fourth yeare, whereby the said fourth yeare is called Leap-yeare, because it hath one day more than the primary or fore-going yeares.

And so this Table being made for foure yeares, would serve for a long time, were it not the said fourth yeare is just 366 dayes wanting but 20 minutes or the $\frac{1}{3}$ of an houre, or if there were a just equality made of the dayes of the yeares, with the progresse

of

of the Sun through the Zodiack, then this Table would serve for a long time without correction: but onely the Zodiack, with the whole eight Spheares hath a certaine retrograde motion or going backward, yet so unsensibly, that these Tables being gathered and calculated out of the best and truest Ephemerides for the yéares 1641, 1642, 1643, 1644, according to the true place and daily motion of the Sunne there exactly gathered, I make no question but that they will very well serve for 20 yeares at the least, the difference of the Sunnes place every 5 yeare is so small, being not much above 30 seconds or halfe a minute, which in twenty yeares being 5 Bissextiles or Leap-yeares, makes 2 minutes and 30 seconds, a small matter to make any difference in the Sunnes declination.

Notwithstanding which small errour that can grow in so long time, I have for the satisfying those ingenious Spirits which desire perfection in their workes, added to the former Almanack, as you may see Tables of the Sunnes equall motions, whereby the Sunnes true place may be found for any time hereafter, and so consequently the Declination, as is before noted in the use of the Tables.

Propositions to be wrought by the Ephemerides or Sea-mans Kalender, as followeth.

To know the Moones Change.

1.

TO know the day and houre of Conjunction or Change of the Moone, first looke in the first page of the Ephemerides, right against the yeare of our Lord, for the Prime number serving to that yeare, which number keeping in memory, turn to the moneth in which you desire the Change of the Moone, and in the first Column of the said Moneth under the title Prime, look for the Prime number which you kept in memory, which Prime numbers are there all in numerall Letters, and right against the said Prime number in the next Column, is the number of the Day of the Moneth on which the Moone changes, and if there be any figure

with the Prime number, marke whether it be before or after the said Prime number; for if it be before, it sheweth the Moone to change so many houres before Noone: if after, it sheweth so many houres after Noone: but if there be no figures at all with the Prime number, then the Moone changes just at Noone.

As for Example.

In the years 1647. I would know in June upon what day and houre of the said moneth the Moone changes: In the first Page being an Almanack of 24 yeares for the Prime, Epact, Dominicall Letter, and moveable Feasts; I find the Prime for the yeare to be xiiij, which keeping in memory I turne to June, and in the first Colume thereof under the title Prime, among the numerall letters, I seeke for xiiij, which I find right against the 21 day of the moneth, thus xiiij with no figure after it, which sheweth, that in June 1647. the Moone changes the 21 day just at Noone.

Againe, in September the same yeare, the Prime xiiij under the title Prime in the moneth of September, I find the Prime aforesaid right against the 17 day of the Moneth with the figure 2 after it, and further, against it in the third Colume amongst the Letters for the dayes of the Weeke is the letter A, which by reason that C is the Dominicall or Sunday letter for that yeere, A stands for Friday; so that I conclude, that in September 1647, the Moone will change the 17 day being Friday, two houres after Noone.

Of the Full and Quarters of the Moone.

THe next thing to be considered herein, is the first Quarter, the Full Moon, and the last Quarter thereof, which is thus done: To the time of her Change, adde 7 dayes and 6 houres, whereby the first Quarter, that doubled sheweth the Opposition or Full: and thereto againe, the said 7 dayes 6 houres added, makes the time of the last Quarter.

To

To know what Sine the Moone is in.

3.

A third thing needfull to be knowne, is in what Sine the Moone is at all times, which may thus be done; Upon the Change day next before your Day required, looke in the second Section of the Ephemerides under the yeare desired, and the Column of the place of the Sunne for the day and yeare, what Sine and degree thereof the Sun was in upon the said day of the Conjunction, for then were the Sunne and Moone both in one Sine and degree, and to know what Sine she is in any day after, multiple her Age by 12, which is the meane motion of the Moone, and from the day of the Conjunction in the Column of the true place of the Sun, tell forward, if the number be so great out of the Month to the next till you have told the number of the Product of the Moones age, multiplyed by 12. and where the said Product number ends, is the Sine and degree of the Moone.

Example.

The 16 of October 1637, I desire the same, in which Moneth by the first Proposition I find the Moone to change the 8 day just at one of the clock, and being that 1637 is the first yeare after the Leap yeare, in October under the title First yeare, I seek the 8. th day in the first Column thereof, and right against it toward the right hand is 25 deg. 14 min. of ♎, in which Sine and degr. both the ☉ and ☾, were at their ☌ or Change, then counting from the said 8. th day to the 16 day, is 8 dayes for the Moones age, but for her true Place according to your rule before directed unto you, I count forward from the 8 day of ☌, to 8 more, which being 8 times 12 or 96, the said number of 96 ends upon the 12 of January, against which, is in the next Column of the Suns true place two deg. 57 min. of ♒. Therefore I conclude the Moone to be in two deg. 57 min. of ♒, the day and time proposed: otherwise if you multiply the Moones age by 2, and divide the Product by 5, the Quotient shewes the whole Sine, and the remainer so many times 6 degrees as the Moone is gone from that place of the Zodiack where she was in the Conjunction.

The

The Moones comming to the Meridian, with the time of her Rising and Setting.

MUltiply the Moones age by 12, and divide the Product by 15, the Quotient sheweth the houre of the Moones being South, and if any thing remaine after the devision, for every Unity that remaines adde 4 minutes, because 15 degrees make an houre of time, and 4 minutes a Degree. That knowne, learne by the third Proposition what Sine the Moone is in, and then looke out in the second Section, what time and day of the yeare the Sun possesseth the same Sine and Degree thereof, and right against the said Day in the last Columne of the first section, under the title Length of the Day, is the length of the day, the Sun being in the same Sine in houres and minutes: halfe that number of the dayes length taken from the time of the Moones being South, sheweth her Rising, and the said halfe added to the time of her being South, sheweth her Setting.

Example.

The 16 of October 1637, I find the Moone to change the 8 day at Rome, and the number of dayes betwixt that and the 16 day is 8 for the Moones age, then multiplying 8 the Moones age by 12 her meane motion, the Product being 96, divided by 15, the degree answering to an houre of time, the Quotient is 6, which shewes the Moone to be upon the Meridian, or at South at 6 of the clocke that night and 24 min: then by the third Proposition or former Example, I find the Moone to be in 2 degr. 57 min. of Aquarius, and the Sunne being in the same sine, degr. and min. the Diurnall arch or length of the Day, being then 8 houres 24 minutes, is the continuance of the Moone likewise, in her either Diurnall or Nocturnall arch, the ½ thereof taken from her being upon the Meridian, leaveth her rising; and likewise the other halfe added to the time of her being upon the Meridian, sheweth her setting. That you see that the Day and yeare aforesaid, the Moon shall here in our Horizon, rise at 2 a clock afternoone and 12 min. she shall be South or upon the Meridian, at 6 a clock afternoone

and 14 min: she shall set at 10 a clock at night and 36 min. and her continuance above the Horizon, or shining to us is 8 houres 24 minutes. This is a very necessary thing to be knowne, for by her being upon any other point of the Compasse, you may give a very neare gesse at every houre of the night.

The next thing to be considered in the first section, is the Festivall dayes and other dayes of note, which are so common, that they need no explanation. Onely this; before every Feast which is kept Holiday is set this word Fast.

To know the length of the Day, or the length of the Night, with the Rising and Setting of the Sunne.

5.

ALl this is performed by the last Colume of the first section, thus: right against the Day of the Month desired in the last Colume of the said first section under the title Length of the Day, is the length of the day desired in houres and min. which number subtracted from 24 the length of the Naturall day, leaves the length of the Night, and halfe the said number taken from noone, leaves the houre of the Suns rising: the other halfe of the day added to Noone sheweth the Suns setting.

Example.

The 19 of October in the yeare 1638, under the title Length of the Day, right against the said 19 day, is 9 houres 36 minutes the length of the day, which 9 houres 36 min. taken from 24 houres leaves 14 hour. 24 min. for the length of the night: then the halfe of 9 houres 36 min. which is 4 houres 48 min. taken from noone, leaves 7 hour. 12 min. for the Sun rising. The same 4 houres 48 min. added to noone, makes 16 houres 48 min. which is 4 houres 48 min. afternoone. By which you see the 19 of October the length of the day is 9 houres 36 min: the length of the night 14 houres 24 min: The Sun riseth 12 minutes after 7 in the morning, and setteth 48 minutes after 4 in the Evening.

Thus much for the first section: The second section being foure Parts serving for foure severall yeares, every part having 3 Columes; the first the Day of the Moneth; the second, the true Place of the Sun; the third, the Declination of the Sun agreeing thereto,

all the three parts being of like quality, which are so plain and commonly known, that they need no further distinction albeit that the uses thereof are manifold and the commodities excellent: For there are few propositions concerning the Sphear, which can be wrought without the true place of the Sun known, and being so much use for it, there are few meanes for the true knowledge thereof, but only by the Ephemerides, which every one cannot have.

And for that cause I have transferred the true place of the Sun in deg. and min. out of the best Ephemerides into this former Kalender, where it is ready for such as desire the same, or as have occasion to use the same, in working conclusions, or making of Instruments Mathematicall; but most chiefly I have heere placed it to the end that those that stand in doubt of the truth of those Tables of the Sunnes Declination, may at their own pleasure make tryall thereof: The order how to do the same, is set down in the first printed page after the said Tables: for the true place of the Sun, is found the Declination either North or South: and by his Declination and observation of the Suns Altitude upon the Meridian, is known the height of the Pole or Latitude of the place where you are.

How to use the Sunnes Declination, thereby to find out the Elevation of the Pole.

6.

TO find out the Altitude or height of the Poles, in any severall Latitude, viz. How much the Pole is raised above your Horizon in degrees and minutes. It is necessary, first to take by observation, the Meridian Altitude of the Sun, which Meridian Altitude is known, by taking the height of the Sun, that day, in which you would observe, just at none: at which time the Sun is highest, being then also upon the Meridian: which found, note it down in paper or slate: Then knowing the yeere of our Lord, with the Month in which you are, and also the day of the Month; look in the Kalender before spoken of, for the Moneth and day thereof, and right against the said day of the moneth toward the right hand, under title Declination of the Sun, you shall see the severall yeeres, which the said Table of Declination serve for. If

it

it be the Leap-yeare, look in the last of the said foure Tables, under the title Leape-yeere: If it be the first yeare after Leap-yeere, then resort to the first of the said Tables under the title First: and so of the second and third, and after those 4 yeares are past, come back again to the first, and proceed as you did before: then (as I said) having found out the Moneth, Day, and Yeare, direct your eye downward toward the foot of the Table, in the Table which serves for the yeare proposed, till you find a number making a right angle with the day of your moneth: or more plainely, looke what number in the last Colume of your yeare, is right against the day of your month: which numbers are the Declination for the day desired: and being two numbers in the said Colume, the first are degrees, the other minutes: then regard also, whether the Sun hath N. declination or S. declination, which is set down between the severall spaces: where by the way you shall note, that from the Sunnes entrance into Aries, which is about the 11 of March, till his entrance into Libra, which is about the 13 of September, he hath North Declination: and from the said 13 of September, till his entrance into Aries againe, S. Declination: the said declination increasing according to the Sunnes Progresse through the Signes from his entrance into Aries, till his entrance into Cancer, and decreasing from Cancer to the beginning of Libra, Then againe increasing from Libra to Capricorne, and decreasing from Capricorne to the end of Pisces, and beginning of Aries. Aries, Taurus, Gemini, Cancer, Leo, and Virgo, being Signes having North declination from the Equinoctiall Circle: and Libra, Scorpio, Sagitarius, Capricornus, Aquarius, and Pisces, South Signes having South declination from the circle: then knowing (as I have said) the Meridian Altitude of the Sun, the Declination of the Sun, and whether the Sun hath South or North Declination; as these three things are alwayes to be considered, in knowing the height of the Pole. If the Declination be North, subtract the Declination from the Meridian Altitude, the remainer is the Elevation of the intersection or cutting of the Equinoctiall with the Meridian above the Horizon, which in common termes is the Elevation of the Equinoctiall above the Horizon: which height of the Equinoctiall, taken from 90

leaveth the height of the Pole, or the Latitude of the place of your observation. But contrariwise, if the Sun hath South Declination, adde the said Declination to the meridian Altitude, the Product is the height of the Equinoctiall, which likewise taken from 90 leaveth also the height of the Pole.

Example.

I observed the 11 of July 1638, in the City of London, and found the Meridian Altitude of the Sunne to be 59 deg. 22 min. and the Declination of the Sun North 20 deg. 33 min. Being that the declination was North I subtracted 20 deg. 33 min. the Declination of the Sun at noone: the remainer was 38 deg. 29 min. the height of the Equinoctiall: that taken from 90 leaves 51 deg. 31 min. for the height of the Pole, or Latitude of London.

This rule is to be understood, when you are between the Equinoctiall and the North Pole, and the Sun to the Southward of you: But if you should be between the Equinoctiall and the South Pole and the Sun North from you, then must you work contrary: for then if the Sun hath South Declination, you must subtract the Declination from the Meridian Altitude, and if the Sun hath North Declination, you must adde the said Declination to the Meridian Altitude.

For Example.

Being at Sea to the Southwards of the Line the 4 of January 1638, suppose that you observe the height of the Sun at noon, and find it to be 66 deg. 20 min. then you shall find the Declination to be 21 deg. 17 min. to the Southwards, which subtracted from 66 deg. 20 min. the Meridian Altitude leaves 45 deg. 3 min. for the height of the Equinoctiall: that taken from 90, rests 44 deg. 57 min. for the height of the South Pole above the Horizon.

Again, suppose that being at Sea, the 10 of May 1638, and observing the Sun, you take the Altitude at noon 60 deg. 30 min. and his declination then is 20 deg. 5 min. Northwards, but then not having observed long before, you know not whether you are to the Northwards of the Equinoctiall, or to the Southward of the said Line, to know which, set the Sunne by your Compasse, and marke which way the shadow of the Sun streketh: for if he casteth his shadow the same way that the Declination is, then is the

Sun

ſun betwixt Equinoctiall and you. Your ſelf being alſo the ſame way that the Suns Declination is: and therefore ſubtracting the Declination 20 deg. 5 min. from 60 deg. 30 min. the Meridian Altitude, reſts 40 deg. 25 min. the height of the Equinoctiall, the complement whereof 49 deg. 35 min. is the Elevation of the North Pole: but if the Sun caſts his ſhadow contrary to his Declination, that is to ſay, If having North Declination, his ſhadow goeth Southward or having South declination, caſts his ſhadow Northward: Then either the Equinoctiall ſhall be betwixt you and the Sun, or you in the Equinoctiall: or elſe you ſhall be betwixt the Equinoctiall and the Sun: which to know, adde the Declination and the Meridian Altitude for the day propoſed together: If the ſumme of the addition be leſſe then 90 deg. ſo much as it wanteth of 90 deg. ſhall you be diſtant from the Equinoctiall that way which the ſhadow ſtreketh: If it be juſt 90 deg. then are you under the Equinoctiall. Again, if your ſaid Meridian Altitude and Declination added, paſſeth 90 deg. then ſo much as is overplus, you ſhall be from the Equinoctiall towards the Sun, and then alſo you ſhall be betwixt the Equinoctiall and the Sun, and if you find the Sun to be in your Zenith, ſo much as is the Declination ſhall you be from the Equinoctiall, that way that the Sun declineth: By which reaſon if the Sun be in your Zenith, that is 90 deg. high, and hath no Declination, then are you under the Equinoctiall.

How to appropriate the Tables of Declination to any other Meridian.

There is in the uſing the Suns Declination, one principall thing to be conſidered, which is, that a Table of Declination made for any particular place, doth not ſerve generaly for all places, but onely for ſuch places as have the like or neere the ſame Longitude. The reaſon is, becauſe that the Declination is calculated according to the true place of the Sun at noone, at which time the Sun is upon the Meridian at that place for which the ſaid Tables is made: But you muſt note, that the Sun doth not come to the Meridian in all places at a like time, although that in all places the Sun being upon the Meridian makes the middle of

the day. But for every 15 deg. difference of Longitude betwéen any two places, the Sun comes sooner or later to the Meridian by so many houres. For if that place of 15 deg. be to the Eastward of the place prefixed, then the Sun comes sooner to the Meridian by an houre, and if it be 15 deg. to the Westward, later by an houre. And so consequently more or lesse, according to the difference of Longit. By which reason, in what part of the world soeuer you be, you may worke for the declination of the Sun to that place, by the proportionall parts of 24 houres declination to the houre of difference in Longitude.

As for Example.

Being in Brasilia (a part of the West-Indies) the 10 of April this yéer 1638, whose Meridian is distant from the Meridian of England to the Westward about 45 deg. which is 3 hour. of time that the Sunne should come to the Meridian later there then héere at London where the Table is made: For when it is 12 aclock héer it is but 9 there, and being none there, it is 3 aclock here. Therefore to apply this Table to that place, I find the Declination for the day aforesaid under our Meridian to bé 11 deg. 40 min. at noon, and by reason that when it is 11 a clock at Brasilia, it is then at London 3 houres past. Therefore by the rule of proportion, I seek what declination the Sun hath at 3 aclock afternoone, as followeth. I take the difference of the declination betwéen the day aforesaid, and the next following, which is 20 min. then I say by the rule of 3. if 24 houres give 20 min. what gives 3 houres, the time of the difference in Longitude. Facit 2 min. and 30 seconds which (because the declination increases) I adde to the number of the day proposed: so I conclude, the declination of the Sun to be the 10 of April at none in the Kingdome of Brasilia 11 deg. 42 minut.

Againe, the day and time aforesaid, in the Bay of St. Sebastian whose Longit. is 58 deg. to the Eastward of London, answering héere to 4 houres of time, shewing that the Sun comes sooner to the Meridian in the Bay of S. Sebastion, by 4 houres then at London: by which reason the declination is lesse there then at London, because the declination doth increase: For if the declination did decrease, it would be more there then at London: and to know the declination of the Sun in the Bay aforesaid: I take the difference betwixt the Declination of the 10 of April, and the Declination

of

of the day next before being 20 min. Then (I say) if 24 houres gives 20 min. what 4 houres? Facit 3 min. which deducted from 11 deg. 40 min. the declination of the Sun the 10 of April aforesaid at London, leaveth 11 deg. 37 min. The Declination of the Sun at noone, in the Bay of S. Sebastian, being that when it is 12 of the clock there, it is but 8 a clock at London: or in any place having the same Longitude.

How to observe the height of the Pole by the Starres.

THe working hereof by the Starres, to find the height of the Pole, is all alike with the working thereof by the Sun: for if you observe any Star upon the Meridian looke in the Table of the fixed Starres for the name of the Star which you observed, where you shall find his Declination either North or South, and the right ascention thereof in deg. and hundred parts, and having taken the Altitude of any Star upon the Meridian you have nothing to mark in the Table for this but the Declination, which if it be North, take the Declination of the Starre from the height thereof; The remainer, taken from 90 leaveth the height of the Pole: but if the Star hath South Declination, adde the Declination to the altitude taken, and the Product thereof taken from 90 leaves the height of the Pole: Also to find the time of any Starres comming to the Meridian, is set down after the Tables of the Suns right ascension, but for the first day of every Month, you have it in the Table of the Starres.

Example.

THe 25 of November 1638, I observed a Starre of the second bignesse in the wing of Pegasus or the Flying Horse, about 8 of the clock in the evening, and found the Meridian Altitude thereof to be 51 deg. 45 min. and in the Table of the fixed Starres, I find the said Starre to have 13 deg. 17 min. North Declination: which taken from 51 deg. 45 min. the height observed, leaves 38 deg. 28 min. the height of the Equinoctiall: the complement whereof 51 deg. 32 min. is the height of the North Pole at London.

And so consequently for all those Stars whose Declination is taken from the Equinoctiall: but for those Starres which are any thing neer to the Pole whose distance or Declination is counted from the Pole, their working is thus: You must note, that being

any

any thing farre to the Northward, some of those Starrs will be twice upon the Meridian, viz. once above the Pole and once under the Pole: Therefore if you observe any Star upon the Meridian under the Pole adde the distance of the said Star from the Pole to your Altitude observed, the totall is the height of the Pole: But if you observe any Starr upon the Meridian above the Pole, so much as is the distance or Declination of the said Starr from the Pole, you must take from the Altitude taken, the remainer is the height of the Pole.

As for Example.

If at London you observe the former Guard Starre beneath the Pole upon the Meridian, you shall find it to be 37 deg. 16 min. to which if you adde 14 deg. 16 min. the distance of the said Starr from the Pole, the totall is 51 deg. 32 min. the height of the North Pole at London. Againe the same Starr observed upon the Meridian above the Pole, is 65 deg. 48 min. from which 14 deg. 16 min. the distance aforesaid taken, leaveth 51 deg. 32 min. as before.

Note that being farre Northward, those Starres betwæn the Equinoctiall & the Tropick of Cancer are best to observe, & being betwæn the said Tropick and the Equinoctiall those Starrs above the Pole are fittest for observation, and for those that travel farre beyond the Line to the Southwards: the like order must be kept by the Starrs betwæn the Equinoctiall and the Tropick of Capricornus, and those that are nære the South Pole.

And whereas the North Starre being very nær the Pole (and by report) is of most Sea men onely made use of for observation, in our Northerne Navigations. Therefore considering the great use is to made of it, I have calculated an exact Table for the Declination of the North Starre, from the Zenith (in seaven severall Latitudes, viz. Latitude 20. 30 40. 50. 60. 70. 80. upon every severall point of the Compasse) because the said Starr hath not the same Altitude above the Horizon in one Latit. as it hath in another the guards being upon ye same point of the Compasse as you may see in the Table following; yet ye difference is not so great as some have supposed. It is very commodious because whereas other Starrs are only to be observed upon this Meridian, this Starr by the help of this Table may bee observed at any time of the night, whose use followeth.

If

Points of the Compasse.	Lattit. 20 D.	M.	Lattit. 30 D.	M.	Lattit. 40 D.	M.	Lattit. 50 D.	M.	Lattit. 60 D.	M.	Lattit. 70 D.	M.	Lattit. 80 D.	M.	Of Declinaion
N W. by W		0	00	0	00	0	00	0	00	0	00	0	3	0	35
Northwest.		0	24	0	25	0	25	0	27	0	29	0	33	0	42
N W. by N.		0	54	0	55	0	56	0	57	0	58	1	1	1	10
N. N W.		1	22	1	23	1	23	1	24	1	25	1	28	1	34
N. by W.		1	48	1	48	1	49	1	50	1	50	1	52	1	57
North.		2	8	2	8	2	8	2	8	2	8	2	10	2	13
N. by E.		2	23	2	23	2	24	2	24	2	24	2	25	2	26
N. N E.		2	34	2	34	2	34	2	34	2	34	2	35	2	35
N E. by N.		2	38	2	38	2	38	2	38	2	38	2	38	2	38
Northeast.		2	37	2	37	2	37	2	37	2	37	2	37	2	37
N E. by E.		2	29	2	29	2	29	2	29	2	30	2	30	2	31
E. N E.		2	16	2	17	2	17	2	17	2	18	2	19	2	22
E. by N.		1	59	1	59	1	59	2	0	2	01	2	2	2	6
East.		1	35	1	35	1	36	1	37	1	38	1	40	1	46
E. by S.		1	9	1	10	1	10	1	11	1	13	1	16	1	23
E. S E.		0	39	0	40	0	41	0	42	0	44	0	47	0	56
S E. by E.		0	8	0	9	0	10	0	11	0	13	0	17	0	27
Southeast.		0	22	0	21	0	20	0	19	0	17	0	13	0	2
S E. by S.		0	52	0	51	0	50	0	49	0	47	0	44	0	33
S. S E.		1	20	1	19	1	19	1	18	1	16	1	13	1	3
S. by E.		1	46	1	46	1	45	1	44	1	43	1	41	1	33
South.		2	6	2	6	2	6	2	5	2	4	2	3	1	57
S. by W.		2	23	2	23	2	23	2	22	2	22	2	21	2	18
S. S W.		2	34	2	34	2	34	2	34	2	33	2	33	2	32
S W. by S.		2	38	2	38	2	38	2	38	2	38	2	38	2	38
Southwest.		2	37	2	37	2	37	2	37	2	37	2	37	2	36
S W. by W.		2	29	2	29	2	29	2	29	2	28	2	26	2	26
W. S W.		2	15	2	15	2	15	2	15	2	14	2	12	2	8
W. by S.		1	57	1	57	1	57	1	56	1	55	1	53	1	47
West.		1	33	1	32	1	32	1	31	1	30	1	27	1	18
W. by N.		1	7	1	6	1	5	1	4	1	3	1	0	0	47
W. N W.		0	37	0	36	0	35	0	34	0	32	0	28	0	17
N w. by W.		0	6	0	5	0	4	0	3	0	1	0	0	0	0

If the former Guard be — Then the Pole Starre is — Under the Pole.

If the former Guard be — Then the Pole Starre is — Above the Pole.

This former Table ſheweth how much the *North Starre* is either above or below the Pole, in any of theſe ſeven Latitudes, ſet downe at the top of the Table, the Guards being upon any Point of the Compaſſe.

The uſe of which Table is thus, having obſerved the Altitude of the N. Starre, marke as néere as you may or rather obſerve by a Nocturnall made of purpoſe upon what point of the Compaſſe the Guard then is; Next conſider, which of theſe ſeven Latitudes you are néereſt unto, which you may eaſily know by your account of your Ships way. Then reſort to this Table, and finding therein the ſaid point, upon which the Guard was at your obſervation, right againſt the ſame in the Colume of the Latitude you are néereſt unto, is the number of Deg. and Minutes that the Star is either above or below the Pole, which number ſo found, if it be above the Pole, it muſt be ſubtracted from your Altitude taken, but if it be below the Pole, it muſt be added to the ſaid Altitude taken, which Totall added or remainer ſubtracted is the true height of the Pole.

As for Example.

Obſerving the North Starre to bée 58 deg. 30 min. when the Guard is at the N E. néere Latitude 60 deg. 00 min. I looke in the Table for the N E. point of the Compaſſe in Latitude 60 deg. 00 min. and right againſt the ſame, I find 2 deg. 37 min. under the Pole, which being that the North Starre is under the Pole, I adde his Declination 2 deg. 37 min. to 58 deg 30 min. his Altitude obſerved, and the totall is 61 deg. 7 min. the juſt height of the Pole in that place.

Againe,

Againe, observing the North starre to be 50 deg. 15 min. above the Horizon, when the Guard is upon the South-East point of the Compasse, néere Latitude 60 deg. 00 min. I looke for South-East in the Table and right against the same is 17 minutes, above the Pole, which being that the Star is then so much higher than the Pole it selfe, I subtract 17 minutes the Declination of the Star from 50 degrées 15 min. and the remainer is 49 deg. 58 minutes, the perfect height of the Pole above the Horizon, in the said place of observation.

And now having made plain unto you the use and profit of the said Table, it being indéed so necessary and commodious for the Mariners use, as any rule whatsoever; it resteth now to speak somewhat more particularly of the other fixed Stars, set down in the Tables following, wherein are, in the first Page eleven Columes, the first is the number of the Stars which are 77; the second is their Names, the third is their Magnitudes, either the 1, 2, or 3, Magnitude, the fourth is their Right Ascensions in degrées and hundred parts; the fift is their Difference of their Right Ascensions for 100 yeeres; the sixth is their Declination in degrees and Minutes; the seventh, is the name of their Declination, S. signifying South, and N. signifying North; The eighth is their Difference of their Declination for 100 yeares; The ninth sheweth whether their difference of their Declination be to be added or subtracted, A signifieth to adds, and S to subtract. In the 10 and 11 Columes, and so along over the second Page at the top of the Colume, are the names of the 12 Moneths, and under them in the Columes of every Moneth are the Houres and hundreth parts of an houre, that any of these Starres come to the Meridian the first day of every Moneth; the letter M. sheweth the houre to bee betwéen midnight and noone, and the letter A sheweth the houre to be between Noone and Midnight, next after the Table of the Stars followes a Table of the Suns Right Ascension in Houres and hundred parts, the use of which Tables followes after the Tables,

The right Ascension and Declination, of 77 of the Principall fixed with the Difference of the Right Ascension

N.	Names, 1636.	M	Right Ascension.	Diff. 100 yeer.	Decli. nation	S. or N	Diff. 100 yeer.	Janu H. pts	Febru H. pts
			D Parts	D. pts	D. M.		M.	A	A
1	Nor. in the Whales taile	3	09 28	1 30	10 49	S	34 S	4 48	2 34
2	In Cassiopeiaes lip,	3	00 53	0 00	58 34	N	1 0	4 50	2 36
3	Souther. of the Croziers,	2	03 00	0 00	67 30	S	0 0	4 70	2 56
4	South. in the Whales taile	2	06 32	1 27	20 0	S	34 S	4 88	2 74
5	The Pole Starre,	2	06 65	3 28	87 21	N	34 A	4 90	2 76
6	S. in Andromedaes girdle	2	12 47	1 39	33 47	N	33 A	5 29	3 15
7	The Whales back	3	12 50	0 00	12 20	S	0 0	5 30	3 16
8	In Cassiopeiaes knee,	3	15 50	0 00	58 55	N	0 0	5 50	3 36
9	South. in the Rams horne	3	23 44	1 36	17 29	N	31 A	6 02	3 88
10	North. in the Rams horne	3	23 60	1 44	19 6	N	27 A	6 03	3 89
11	The Rams head, (jaw	3	26 50	0 00	21 42	N	0 0	6 23	4 09
12	Brightest in the Whales	2	40 88	1 22	2 39	N	27 A	7 18	5 04
13	The head of Medusa,	2	40 21	1 61	39 31	N	25 A	7 21	5 07
14	Perseus right side,	2	44 50	0 02	48 38	N	0 0	7 45	5 29
15	After in Perseus left foot,	3	52 91	1 57	30 47	N	29 A	7 99	7 85
16	Last of Eridanus,	1	43 60	0 00	40 0	S	0 0	this is	at the
17	The Bulseye,	1	63 78	1 45	15 48	N	10 A	9 71	6 57
18	The Goat Hircus,	1	72 47	1 85	45 35	N	10 A	9 29	7 15
19	Orions left foot,	1	74 13	1 40	8 40	S	9 S	9 40	7 26
20	Orions left shoulder,	2	76 44	1 35	5 59	N	7 A	9 55	7 41
21	Farr in Orions girdle,	2	78 00	0 00	0 38	S	0 0	9 66	7 52
22	Orions right shoulder,	2	88 91	1 37	7 17	N	3 A	10 95	7 91
23	The Wagon: right shoulder	2	88 25	0 00	41 50	N	0 0	10 35	8 21
24	Brightest in Pollux feet,	2	94 17	1 47	16 40	N	3 S	10 74	8 60
25	Cannopus,	1	95 00	0 00	51 50	S	0 0	10 80	8 66
26	The great Dog,	1	97 30	1 14	16 13	N	5 A	10 94	8 80
27	1. Head Gemini Castor,	2	107 84	1 64	6 8	N	11 S	11 65	9 51
28	The little Dog,	1	110 10	1 35	6 8	N	11 S	11 80	9 66

Starres, and their coming to South the first Day of every Month, and Declination of 51 of them for 100 Yeares.

Marc.	April	May	Iune	July	Augu.	Septē.	Octo.	Novē	Decē.	N.
H. pts	H. pts	H. pts	H. pts	H. pts	H. p	H. p	H. pts	H. pts	H. pts	
A	M	M	M	M	M	M	A	A	A	
0 57	10 69	8 81	6 72	4 65	2 62	0 72	10 91	8 92	6 78	1
0 59	10 71	8 83	6 74	4 67	2 94	0 74	10 93	8 94	6 80	2
0 79	10 91	9 03	6 94	4 87	2 84	0 94	11 13	9 14	7 00	3
0 97	11 09	9 21	7 12	5 05	3 02	1 12	11 31	9 32	7 18	4
0 99	11 11	9 23	7 14	5 07	3 04	1 14	11 33	9 34	7 20	5
1 38	11 50	9 62	7 53	5 46	3 43	1 53	11 72	9 73	7 59	6
1 39	11 51	9 63	7 54	5 47	3 44	1 54	11 73	9 74	7 60	7
1 59	11 71	9 83	7 74	5 67	3 64	1 74	11 93	9 94	7 80	8
	A						M			
2 11	0 23	10 35	8 26	6 19	4 16	2 26	0 45	10 45	8 32	9
2 12	0 24	10 36	8 27	6 20	4 17	2 27	0 46	10 47	8 33	10
2 32	0 44	10 56	8 47	6 40	4 37	2 47	0 66	10 67	8 53	11
3 27	1 39	11 51	9 42	7 35	5 32	3 42	1 61	11 62	9 48	12
3 30	1 42	11 54	9 45	7 38	5 35	3 45	1 64	11 65	9 51	13
3 52	1 64	11 76	9 67	7 60	5 57	3 67	1 86	11 87	9 73	14
		A						M		
4 08	2 20	00 32	10 23	8 16	6 13	4 23	2 42	0 43	10 29	15
same	Time	with	Perseus	righ:	side.					16
4 80	2 92	1 04	10 95	8 83	6 85	4 95	3 14	1 15	11 01	17
5 38	3 50	1 62	11 53	9 46	7 43	5 53	3 72	1 73	11 59	18
5 47	3 61	1 73	11 64	9 57	7 54	5 64	3 83	1 84	11 70	19
5 64	3 76	1 88	11 79	9 72	7 69	5 79	3 98	1 99	11 85	20
5 75	3 87	1 99	11 90	9 32	7 80	5 90	4 09	2 10	11 96	21
			A						M	
6 14	4 26	2 38	0 29	10 81	8 19	6 29	4 48	2 49	0 35	22
6 44	4 56	2 68	0 59	10 52	8 49	6 59	4 73	2 79	0 65	23
6 83	4 95	3 07	0 29	10 91	8 88	6 93	5 17	3 18	1 04	24
6 89	5 01	3 13	1 04	10 97	8 94	7 04	5 23	3 24	1 10	25
7 03	5 15	3 27	1 18	11 11	9 08	7 18	5 37	3 38	1 24	26
7 74	5 86	3 98	1 89	11 82	9 79	7 89	6 03	4 09	1 95	27
7 89	6 01	4 13	2 04	11 97	9 94	8 04	6 23	4 24	2 10	28

The right Ascension and Declination, of 77 of the Principall fixed with the Difference of the Right Ascension

N.	Names, 1636.	M	Right Ascension D.Parts	Diff. 100 yeer D.pts	Declination D. M	S. or N	Diff. 100 yeer M.	Ianua H pts.	Febru. H. pts.
								A	A
29	2d. Head, Gemini, Pollux,	2	110 77	1 59	8 51	N	12 S	11 84	9 70
								M	
30	N W. Angle, S. Triangle	2	121 00	0 00	62 35	S	0 0	0 53	10 39
31	Souther. Arme the Crab	3	129 63	1 39	13 22	N	22 S	1 10	10 96
32	Souther. South Triangle	3	135 00	0 00	78 30	S	0 0	1 46	11 42
33	Hydraes head,	1	137 46	1 25	7 5	S	26 A	1 62	11 48
									M
34	Lyons Necke,	2	146 50	0 00	21 52	N	0 0	2 22	0 08
35	Lyons Heart,	1	147 25	1 37	23 42	N	29 S	2 27	0 13
36	Great Beares side,	2	159 75	0 00	58 19	N	0 0	3 11	0 97
37	Great Beares back,	2	160 22	1 67	63 43	N	33 S	3 14	1 00
38	Lyons back,	2	163 50	0 00	22 33	N	0 0	3 36	1 22
39	Dragons taile,	3	167 00	0 00	71 34	N	0 0	3 60	1 46
40	Lyons taile,	1	172 51	1 33	16 37	N	34 S	3 97	1 83
41	Great Beares thigh,	2	173 50	0 00	55 47	N	0 0	4 03	1 89
42	Centaurus thigh,	2	178 50	0 00	49 30	S	0 0	4 36	2 22
43	First in the Ravens wing	3	179 63	1 03	15 29	S	34 A	4 43	2 29
44	1. In the great Beares-taile	2	189 42	1 15	57 59	N	34 S	5 09	2 95
45	Virgins Spike,	1	196 50	1 32	9 12	S	33 A	5 56	3 42
46	2. In the great Beares taile	2	197 28	1 04	56 52	N	33 S	5 61	3 47
47	3. In the great Beares taile	2	203 27	1 63	51 11	N	30 S	6 01	3 87
48	Centaurus right shoulder,	3	206 36	1 48	35 8	S	30 A	6 22	4 08
49	Arcturus,	1	209 81	1 20	21 8	N	30 S	6 45	4 31
50	South Ballance,	2	217 74	1 39	14 27	S	27 A	6 97	4 83
51	Centaurus foot,	2	221 00	0 00	60 6	S	0 0	7 20	5 06
52	Foremost Guard,	2	222 91	0 19	75 44	N	25 S	7 32	5 18
53	North Ballance,	2	223 75	0 00	7 57	S	0 0	7 37	5 23
54	Brightest North crowne,	2	229 83	1 07	27 58	N	25 S	7 78	5 64

Starres, and their cõming to South the first Day of every Month, and Declination of 51 of them for 100 Yeares.

Marc.	Aprill	May	Iune	Iuly	Augu.	Septẽ.	Octo.	Novẽ	Decẽ.	N.
H. pts	H. pts	H. pts	H. pts	H. pts	H. pts	H. pts	H. pts	H. pts	H. pts	
A	A	A	A	A	M	M	M	M	M	
7 93	6 05	4 17	2 08	0 01	9 98	8 08	6 27	4 28	2 14	29
8 62	6 74	4 86	2 77	0 70	10 67	8 77	6 96	4 97	2 83	30
9 19	7 31	5 43	3 34	1 27	11 24	9 34	7 53	5 54	3 40	31
9 55	7 67	5 79	3 70	1 63	11 60	9 70	7 89	5 90	3 76	32
9 71	7 83	5 95	3 86	1 79	11 76	9 86	8 05	6 06	3 92	33
					A					
10 31	8 43	6 55	4 46	2 39	0 36	10 46	8 65	6 66	4 52	34
10 36	8 48	6 60	4 51	2 44	0 41	10 51	8 70	6 71	4 57	35
11 20	9 32	7 44	5 35	3 28	1 25	11 35	9 54	7 55	5 41	36
11 23	9 35	7 47	5 38	3 31	1 28	11 38	9 57	7 58	5 44	37
11 45	9 57	7 69	5 60	3 53	1 50	11 60	9 79	7 80	5 66	38
11 69	9 81	7 93	5 84	3 77	1 74	11 84	10 03	8 04	5 90	39
M						A				
0 05	10 18	8 30	6 21	4 14	2 11	0 21	10 40	8 41	6 27	40
0 12	10 24	8 36	6 27	4 20	2 17	0 27	10 46	8 47	6 33	41
0 45	10 57	8 69	6 60	4 53	2 50	0 60	10 79	8 80	6 66	42
0 52	10 64	8 76	6 67	4 60	2 57	0 67	10 86	8 87	6 73	43
1 18	11 30	9 42	7 33	5 26	3 23	1 33	11 52	9 53	7 39	44
1 65	11 77	9 89	7 80	5 73	3 70	1 80	11 99	10 00	7 86	45
							A			
1 70	11 82	9 94	7 85	5 78	3 75	1 85	0 04	10 05	7 91	46
	M									
2 10	0 22	10 34	8 25	6 18	4 15	2 25	0 44	10 45	8 31	47
2 31	0 43	10 55	8 46	6 39	4 36	2 46	0 65	10 66	8 52	48
2 54	0 66	10 78	8 69	6 62	4 59	2 69	0 88	10 89	8 75	49
3 06	1 18	11 30	9 21	7 14	5 11	3 21	1 40	11 41	9 27	50
3 29	1 41	11 53	9 44	7 37	5 34	3 44	1 63	11 64	9 50	51
3 41	1 53	11 65	9 56	7 49	5 46	3 56	1 75	11 76	9 62	52
3 46	1 58	11 70	9 61	7 54	5 51	3 61	1 80	11 81	9 67	53
		M						A		
3 87	1 99	0 11	10 2	7 95	5 92	4 02	2 21	0 22	10 08	54

The right Ascension and Declination, of 77 of the Principall fixed with the Difference of the Right Ascension

N.	Names, 1636.	M.	Right Ascension	Diff. 100 yeer	Decli-nation	S. or N	Diff. 100 yeer.	Janua	Febru.
			D. Parts	D. pts	D. M		M	H. pts. M	H. pts. M
55	Brightest of Serpents neck	2	230 78	1 23	7 53	N	21 S	7 84	5 70
56	Hindermost Guard,	2	231 25	0 00	73 23	N	0 0	7 88	5 78
57	The Scorpions heart,	1	341 80	1 53	25 32	S	16 A	8 58	6 44
58	Serpentarius right knee,	3	252 42	1 46	15 11	S	10 A	9 29	7 15
59	Hercules head,	3	254 50	0 00	14 53	N	0 0	9 43	7 29
60	Sagitarius arrow head,	3	265 81	1 62	29 68	S	2 A	10 18	8 04
61	The Dragons head,	3	267 07	0 38	51 37	N	2 A	10 26	8 12
62	The Harpe,	1	276 15	0 85	38 29	N	4 A	10 87	8 73
63	Sagitarius knee,	2	281 00	0 00	74 42	S	0 0	11 20	9 06
64	The Swans mouth,	3	289 01	1 03	27 18	N	12 A	11 73	9 59
65	Sagitarius left thigh,	3	293 09	1 67	35 30	S	14 S	11 00 A	9 86
66	The Vultures hart Alkair,	3	293 26	1 22	7 58	N	14 A	0 01	9 87
67	The Dolphins taile,	3	304 00	0 00	27 10	N	0 0	0 73	10 59
68	The Swans taile,	2	307 27	1 08	44 01	N	20 A	0 94	10 80
69	The Dolphins head,	3	307 46	1 19	14 52	N	21 A	0 96	10 82
70	Cepheus right shoulder,	3	317 50	0 00	61 00	N	0 0	1 63	11 49
71	Pegasus mouth,	3	321 62	1 24	8 14	N	26 A	1 90	11 76
72	In the taile Capricorne,	3	321 75	0 00	17 51	S	0 0	1 91	11 77 A
73	Fomahant,	1	339 38	1 31	31 27	S	32 S	3 08	0 94
74	Pegasus right shoulder,	2	341 57	1 22	26 09	N	32 A	3 23	1 09
75	Pegasus wing,	2	341 68	1 26	13 17	N	32 A	3 24	1 40
76	Head of Andromeda,		357 43	1 29	27 06	N	31 A	4 29	2 15
77	Brightest Cassiopeiaes (Chair,		357 52	1 27	57 10	N	33 A	4 29	2 15

Starres, and their cõming to South the first Day of every Month, and Declination of 51 of them for 100 Yeares.

Marc.	April	May	Iune	Iuly	Augu.	Septẽ.	Octo.	Nov.	Decẽ.	N.
H. pts	H. pts	H. pts	H. pts	H. pts	H. pts	H. pts	H. pts	H. pts	H. pts	
M	M	M	A	A	A	A	A	A	M	
3 93	2 05	0 17	10 08	8 01	5 98	4 08	2 27	0 26	10 14	55
4 01	2 13	0 25	10 16	8 09	6 06	4 16	2 35	0 36	10 22	56
4 67	2 79	0 91	10 42	8 75	6 72	4 82	3 01	1 02	10 88	57
5 38	3 50	1 62	11 53	9 46	7 44	5 54	3 72	1 73	11 59	58
5 52	3 64	1 76	11 67	9 60	7 58	5 68	3 86	1 87	11 73	59
			M						A	
6 27	4 39	2 51	0 42	10 35	8 32	6 42	4 62	2 62	0 48	60
6 35	4 47	2 59	0 50	10 43	8 40	6 50	4 69	2 70	0 56	61
6 96	5 08	3 20	1 11	11 04	9 01	7 11	5 89	3 31	1 17	62
7 29	5 41	3 53	1 44	11 37	9 34	7 44	5 68	3 64	1 50	63
7 82	5 94	4 06	1 97	11 87	9 87	7 97	6 16	4 17	2 03	64
				M						
8 09	6 21	4 33	2 24	0 17	10 14	8 24	6 43	4 44	2 30	65
8 10	6 22	4 34	2 25	0 18	10 15	8 25	6 44	4 45	2 31	66
8 82	6 94	5 06	2 97	0 90	10 87	8 97	7 16	5 17	3 03	67
9 03	7 15	5 27	3 18	1 11	11 08	9 18	7 37	5 38	3 24	68
9 05	7 17	5 29	3 20	1 13	11 10	9 20	7 39	5 40	3 26	69
9 72	7 84	5 96	3 87	1 80	11 77	9 87	8 06	6 07	3 93	70
					M					
9 99	8 11	6 23	4 14	2 07	0 04	10 14	8 33	6 34	4 20	71
10 00	8 12	6 24	4 15	2 08	0 05	10 15	8 34	6 35	4 21	72
11 17	9 29	7 41	5 32	3 25	1 22	11 32	9 51	7 52	5 38	73
11 32	9 44	7 56	5 47	3 40	1 37	11 47	9 66	7 67	5 53	74
11 33	9 45	7 57	5 48	3 41	1 38	11 48	9 67	7 68	5 54	75
A						M				
0 38	10 50	8 62	6 53	4 46	2 43	0 53	10 72	8 73	6 59	76
0 38	10 50	8 62	6 53	4 46	2 43	0 53	10 72	8 73	6 59	77

A Table of the right Ascension of the Sunne every day at Noone, in Houres and hundred parts.

Dayes	January		Febru.		Marc.		April.		May		June.	
	H.	parts.	H.	pts.	H.	pts.	H.	pts.	H.	pts.	H.	pts.
1	19	54	21	68	23	45	1	33	3	21	5	30
2	19	61		75		51		33		28		37
3	19	68		81		57		45		34		44
4	19	76		88		63		51		41		51
5	19	83		94		69		57		47		57
6	19	90	22	01		75		63		54		64
7	19	97		07		81		69		61		71
8	20	04		13		87		76		67		78
9	20	11		20		93		82		74		85
10	20	18		26	24	00		88		80		92
11	20	25		33	00	06		94		87		99
12	20	33		39		12	2	00		94	6	06
13	20	40		45		18		07	4	00		13
14	20	47		52		24		13		07		20
15	20	53		58		30		19		14		27
16	20	60		64	01	36		25		21		34
17	20	67		71		42		32		27		41
18	20	74		77		48		38		34		47
19	20	81		83		54		44		41		54
20	20	88		89		60		51		48		61
21	20	95		96		66		57		54		68
22	20	01	23	02		72		63		61		75
23	21	08		08		78		70		68		82
24	21	15		14		84		76		75		89
25	21	22		20		90		82		82		96
26	21	28		26		69		89		89	7	02
27	21	35		32	00	02		95		95		09
28	21	42		39	01	08	3	02	5	02		16
29	21	48				14		08		09		23
30	21	55				20		15		19		30
31	21	61				27				23		

A Table of the right Ascension of the Sunne every day at Noone, in Houres and hundreth parts.

Dayes	Iuly. H.	pts.	Augu. H.	pts.	Septē. H.	pts.	Octob H.	pts.	Novē. H.	pts.	Decē. H.	pts.
1	7	37	9	46	11	30	13	11	15	10	17	24
2	7	43		46		36		17		17		31
3	7	50		52		42		23		24		38
4	7	57		59		48		29		31		46
5	7	64		65		54		35		38		53
6	7	70		71		60		42		45		61
7	7	77		78		66		48		51		68
8	7	84		84		71		54		58		75
9	7	90		90		77		60		65		83
10	7	97		96		83		67		72		90
11	8	04	10	02		89		73		79		98
12	8	10		08		95		80		86	18	05
13	8	17		15	12	01		86		93		13
14	8	24		21		07		92	16	01		20
15	8	30		27		13		98		08		27
16	8	37		33		19	14	05		15		35
17	8	43		39		25		11		22		42
18	8	50		45		31		18		29		50
19	8	57		51		38		24		36		57
20	8	63		57		44		31		43		64
21	8	69		63		50		37		51		72
22	8	76		69		56		44		58		79
23	8	82		75		62		50		65		87
24	8	89		81		68		57		72		94
25	8	95		88		74		63		80	19	01
26	9	02		94		80		70		87		09
27	9	08	11	00		86		77		94		16
28	9	15		06		92		83	17	02		23
29	9	21		12		98		90		09		30
30	9	27		18	13	04		97		16		38
31	9	34		24			15	04				45

A Deſcription of the former Table of the Sunnes right Aſcenſion.

I Thinke it not amiſſe before I ſhew the uſe of the former Table of right Aſcenſion, for the finding of the time of any Starre comming to the Meridian, to explaine unto you what we call right Aſcenſion.

Know therefore, that in the Spheare there is Right aſcenſion, Oblique aſcenſion, and meane Aſcenſion, which have all ſeverall deſinitions: but the reſt being impertinent, I will only ſpeake of Right aſcenſion which is thus defined: Right aſcenſion is that portion of the Equinoctiall which commeth to the Meridian of Lon-ſtead with any Starre, or any part of the Ecliptick: or more plainly, it is that number of degrées of the Equinoctiall, comprized betwixt the Vernall Equinoctiall point, or interſection of the ſaid Equinoctiall circle, and the firſt min. of Aries, and that Starre or part of the Ecliptick which is upon the Meridian at the day or time deſired. As for your better underſtanding, if the beginning of Aries be upon the Meridian, or any point or Star in the ſaid beginning of Aries, then hath the ſaid point or Starre ſo ſcituated, no right Aſcenſion at all, by reaſon that the beginning of the Equinoctiall commeth to the Meridian therewith: But if in the beginning of Cancer, or any Star in that ſcituation be upon the Meridian, then is there with it under the ſame Meridian 90 degrées of the Equinoctial or 6 houres of time, being that every 15 degrées of the Equinoctiall anſwers to one houre of time, ſhewing that the Star or point, which is in the beginning of Aries, ſhall come to the Meridian 6 houres ſooner than that other which is in the beginning of Cancer, and ſo others: I doubt not but that theſe few words will ſuffice to give you the better light to that which followes. Firſt therefore, to find the right Aſcenſion of the Sunne at any time, looke for the Moneth in the head of the Table, and for the day of the moneth at the left ſide of that face, where the Moneth deſired is, and in the common Angle anſwering to them both: is the houre and minute of the Sunns right aſcenſion.

The

The Use of the former Tables of the fixed Starres, and of the Suns right Ascension.

BEfore we come to the Use of these Tables, we will answer an Objection that may be made, what the cause is, that all the Stars have not the difference of their right Ascension and Declination as well as 51 of them; I answer, because those 51 were calculated before-hand for my owne use for the yeare 1636, and since the Booke came to my hand to peruse, I have not had time to doe it, yet in regard those 26 Starres that are not so calculated, have been in the Book ever since the first Impression, I doubt not but many Sea-men have taken notice of them to know them for their use; and therefore, it were a great injury to them that leave them out: But besides, it were a greater injury to the Author of the Book (deceased) utterly to cashiere any thing that he formerly published.

To find the time of any Starres comming to the Meridian the first day of every Moneth, see the number of the Star in the first Colume of the left hand Page, and seek the same number in the last Colume of the right hand Page, and in the same line under the name of the Moneth, you shall see the Houre and hundreth part that the Starre comes to the Meridian at.

Example.

I desire to know at what time the Buls-eye comes to the Meridian the first of January, I looke in the first Colume of the left hand Page, and I find his number 17, then I look 17 in the last Colume of the right hand Page, and right under January in the same line, I find 8 houres and 71 hundred parts, and because I find the letter A next over-head, I see it is Afternoone, that is 8 of the clock at night, and 71 hundred parts, which is neare three quarters of an houre, and so of all other.

But if I desire to know the time of this Star comming to the Meridian the 21 of January, first I look in the Table of the Suns

right Aſcenſion, and I find the Sunnes right Aſcenſion to be the firſt of Ianuary 19 houres and 54 parts, and the 21 of Ianuary, I find it to be 20 houres and 95 parts, the difference is 1 houre 41 parts, which I ſubtract from 8 houres 71 parts, the time of the Starres comming to the Meridian the firſt of Ianuary, and the remainer is 7 a clock and 30 parts, that is more then one quarter of an houre, the time of the Starres comming to the Meridian the 21 of Ianuary, and the like of all other.

But if the difference of the Sunnes right Aſcenſion, betweene the firſt day of the Moneth and the day you deſire, know the time of the Stars comming to the Meridian, be more than the time of the Stars comming to the Meridian, the firſt day of the Moneth you muſt adde 12 houres to it. As if I would know what time ♆ Vultures-heart comes to the Meridian the 16 of Iuly, the firſt of Iuly it comes to the Meridian 0 houres 18 parts of an houre after midnight, the Suns right Aſcenſion the firſt of Iuly is 7 houres 37 parts, the 16 of July it is 8 houres 37 parts, the difference is one hours, which I ſubtract from 12 houres and 18 parts, the remainer is 11 houres 18 parts at night, the time of the Starres comming to the Meridian the 16 of Iuly, and the like of all other.

Againe, here you may ſee by the Tables, what number of theſe Stars are in rule for obſervation at any time.

Example.

I deſire to know how many of theſe Stars are in rule for obſervation the firſt of Ianuary, I looke in the Table and I find the fourth Starre that is the Southermoſt in the Whales-tayle, to come to the Meridian at 4 a clock and 88 parts Afternoone, that is neere 5 of the clock, and ſo I follow on under the Moneth of Ianuary, until I come to 6 a clock 01 part in the Morning, that is the 47 Starre, which is the third in the great Beares-tayle, betweene which and the fourth Starre are 44 Starres that are in rule for obſervation the firſt of Ianuary.

To rectifie the right Aſcenſion of any of thoſe Starres, whoſe difference is given, to any time within 100 yeares.

I Deſire to know the right Aſcenſion of Orions right ſhoulder in the yeare 1686. Subtract 1636 out of 1686, the difference is

50.

50. Then say, if 100 yeares give 1 degr. 37 parts, the difference betwéen 1636 and 1736. What shall 50 yeares give, and you shall find 0 degr. 68 parts, which added to 83 degr. 91 parts, the right Ascension of the said Starre in the yeare 1636, the summe is 84 degr. 59 parts, the right Ascension of the same starre in the yeare 1686, and the like of all other.

To rectifie the Declination of any of these Starres that have the difference given to any time within 100 yeares.

Example.

I Desire to know the Declination of the Pole-Starre for the yeare 1667. I subtract 1636 out of 1667, the difference is 31. Then say, if 100 yeares give 34 minutes, the difference of Declination (as you may sée in the Table) between 1663 and 1736, what shall 31 yeares give, and you shall find 10 minutes and 54 parts, that is 10 minutes and ½ which is to be added, as you may sée by the Letter A in the last Colume, to 87 deg. 21 min. the Declination of the Pole-starre for the yeare 1636, and the whole is 87 degr. 31 ½ minutes, the Declination of the Pole-starre for the yeare 1667. This way of rectifying the right Ascension and Declination, I doubt not but it shall méet with some captious Censurers, but I know the defect between this and calculation cannot be so palpable as theirs in censuring, how be it in the meane time we may sée that the former Tables for the North-Starre that I have calculated, must be renued againe, at most in 20 yeares, or else errours will be in their use.

HAving sufficiently explained unto you the manner and way how both by the Sun and Stars to attain to the true height of the Pole, or Latitude of any place: I purpose now (God willing to speak somwhat of the Longitude: which as the former is most easie: and the finding therof known almost to all Sea-men, so is the other as uncertaine, and hath not yet hitherto béen found out or known exactly to any, albeit that many Learned men and of great experience have laboured very earnestly for the same, and many good means have they invented, as helps and assistance unto Mariners in their long Navigations and Travels, by which though

though with great labour care and industry they transport themselves to the utmost Regions of the world: with farre more ease and facility they might doe it, if they could as perfectly, and readily find the Longitude at all times, as they may the Latitude: for then having sayled many dayes in unknown parts upon the large and spacious Seas, and enduring all those unindurable troubles, miseries, and unspeakable calamities, which doe for the most part attend upon Long-Voyages: yet after all this if upon the first faire opportunity, they could readily with the Latitude, find also the Longitude, their fore-passed troubles would be joyfully remedied, being that these two (like loving sisters) would apply such pleasing comfort to their cold stomacks, after their tedious travels, by giving them the true prick or place of their then present being. Peter Appian and Gemma Frisius, hath written thereof, as also some others: but truly in my opinion, it was never brought to such exquisite perfection, as is now adayes: and for me to write thereof, were but as it were to set up a Candle at noone dayes, rather to shew mine own folly, than to lighten those that know a better way then my selfe: in which doing, well may Appelles saying, Ne sutor ultra crepidam, be applyed unto me, but for my excuse I doe intreat the judicious to perswade themselves that it is farre from my thought to set downe any thing in this for a president unto them, but only in good will to shew my opinion thereof to the Ignorant, being as followeth.

First therefore, the Latitude being knowne: by finding the Longitude also, you have the true prick or place in the Globe, or Card, where your Ship is, which to find the nearest, is two waies, one by dead Reckoning, the other by Observation: but dead reckoning (as they call it) being as I take it most used, I will speak first thereof, by which if it were possible that this Reckoning could exactly and precisely be kept, it would give both Latitude and Longitude without any Observation at all: The different Latitude being only the Distance that the Ship is departed from the Paralell where she last was, either Northward or Southward: and Longit. being the distance that she is departed from the Meridian, either Eastward or Westward: For the knowledge whereof, these things are principally to be considered.

First,

Firſt, the true pitch or place of the Ship being at the beginning of the voyage.

Secondly, a found and experimented judgement of the way that the ſhip maketh, with every ſhift of wind.

Thirdly, to know exactly how much the Compaſſe doth vary from the true North or South point, upon which the Needle is touched, either Eaſtward or Weſtward, in as many ſeverall places, as conveniently may be obſerved.

Fourthly, to note diligently the Flowds or Currents, which may cauſe the ſhips way to be more Eaſtward or otherwiſe than expectation, and to give allowance of her courſe and way accordingly.

Fifthly, the ſeverall points of the Compaſſe that ſhe makes her courſe good upon, and what way ſhe hath made upon every point.

Sixthly, to bring thoſe ſeverall courſes into one ſtreight line, thereby to know what courſe ſhe hath made good, with the direct diſtance upon the ſaid point or Rombe, that ſhe hath made her way good upon.

And laſtly, knowing how many leagues doth raiſe or lay a degree upon the ſaid Rombe, and true reckoning of your ſaid courſe and diſtance gives you the difference of Latitude or the Parallel where the ſhip then is: and alſo knowing how many leagues anſwer to a deg. of Ch. and M. in the ſaid parallel, the courſe, diſtance, and Latitude gives the difference of Longitude or the Meridian, under which the ſhip then is, the interſection of which ſaid parallel and Meridian is the pitch or place of the ſhips then being, of which things I will ſpeak more particularly afterwards.

Now it reſteth to ſpeak ſomething of knowing the Longitude only by obſervation, which is very neceſſary to be known, that thereby the one may make tryall of the other being that if the account by deep reckoning, and alſo by obſervation do both agree in the Latitude and Longitude then may you be aſſured, that you know truly the place where you then are, which Longitude by obſervation is thus known: prepare a very perfect and true running glaſſe, which may preciſely runne 24 houres without errour, and about the time that you purpoſe to ſet ſaile, let the ſaid

glasse a running just at 12 a clock, when the Sunne is upon the Peridian: being run out, be sure to turne the said glasse instantly as it is out: not losing any time in the turning of it, and so having very warily kept the said glasse till you think good to make an observation: at which time it is requisite to have in readinesse a half-houre glasse and a minute glasse, that if the 24 houre glasse be out before the Sun come to the Peridian, then so soone as it is out to turne the halfe houre glasse or min. glasse as you see occasion, therby to know presently how much the 24 houre glasse is out before the Sun comes to the Peridian; for if the Sun is upon the Peridian just when the 24 houre glasse is out: then you may assure your selfe that you have sayled North and S. and are still under the same Peridian you were at the first: but if the 24 houre glasse be out before the Sunne come to the Peridian, for every 4 minutes that the glasse is out before noone, your difference of Longitude is 1 degree to the Westward, and for every houre 15 deg. And contrary, if the Sunne come to the Peridian before the glasse is out then according to the same proportion of time is your difference of Longitude to the Eastward, which difference of Longitude if you multiply by the number of miles answerable to a degree of Longitude in that Latitude, where you then find your selfe to be, the Produkt gives the miles of distance, that you are either to the Eastward or Westward of the Peridian, that you departed from.

The like may also be effected by any of those fixed stars, whose true time of comming to the Peridian you know: for if the accompt of time precisely kept by your glasse, & the stars comming to the Peridian, as you find in your Table of right Ascension do justly agree, then are you still under one and the same Peridian, but if the time be past by your accompt, that the said Star should be upon the Peridian before the Star doth come to the Peridian, for every houre that the Star comes to the Peridian after the said time past, your difference of Longit. is 15 deg to the Westward, and for every houre that the Star comes to the Peridian before by your accompt of time truely kept, it should be upon the Peridian, your difference of Longitude is 15 deg. to the Eastward.

Although

Although the Author of this Booke in his time, knew of no other meanes to attaine the Longitude, then by such as he hath here published: and by the Eclipses which seldome happen, yet seeing it hath pleased God since his time, to reveale a manifest way (which cannot be stopped but will come to perfection) to attaine the Longitude; I suppose it necessary to speak something of it, because it falls out so fitly in this place.

There are wayes which are (not imaginary as some affirme) but reall and grounded upon as certaine Naturall principles as any Mathematicall conclusions whatsoever in Geography or Navigation.

And howsoever, many may expect some excellent way for it, from forraine parts by certaine small Starres neare Jupiter, and that some heere at home would have the world conceited of a way by Celestiall observation, yet it is without doubt, the Longitude must be found by observation made of something below the Moon; for I do truly affirme that there are magneticall Poles, whose Latitude and Longitude I do as certainly know, as Concurrent observations and Arithmeticall Calculations can discover them, and their Annuall motion I know, and by consequent the time of their revolution. It may be objected, that the variation is many, nay most places is very irregular and not according to such magneticall Poles as I speak of, for in some places in the same parallell in equall places, it alters by much swifter then in other, before in the parallel of London there is two deg. 00 Easterly variation to the Eastward of London, and 2 deg. 00 Easterly variation, to the Westwards of London, and yet both these places are to the Eastwards of the first Meridian of the world within 45 deg. of Longitude. It is true, but all this I can very well resolve (I doubt not) but to doe it for all places: moreover, there are some places within a certaine Longitude, whose variations continue constant for hundreds of yeares, and yet afterwards doe vary as ours here at London doth now, but at London it is never constant although in former time the Variation of it was not sensible, as now in its swiftest motion. It were to be wished (that as many

noble minded men have been at charge often times to adventure towards the seeking out of a passage Northwest into the South Sea that some noble-minded would take this into consideration, so that some able men furnished with convenient and exact Instruments might make observation to the Westwards; for the more full perfecting of this worke, it would make much for their lasting fame and for the honour of this Kingdome, but because I am confined to a little roome, I must abruptly end my discourse of Longitude, onely take notice, that those that live until the yeere of our Lord 1657, shall not see any variation at all at London, and afterwards it will increase Westerly at least for 30 yeered, and now it rests to speak somewhat of some necessary helps for the finding thereof by dead reckoning as is before promised, but first I will speake of the Variation.

Of the Variation of the Compasse.

COncerning the Variation of the Compasse, it hath been very learnedly treated on by divers of our own Country-men, and in our vulgar tongue, and namely by Mr. Norman, and Mr. Burrowes, in their Works called the New Attractive, and Variation of the Compasse: And since that, most excellently and ingeniously written of by that rare and learned Mathematician of our time Mr. Wright in his book of the Correction of errours in Navigation: as also in his Translation called the Haven finding Art: In which respect it is needlesse for me here to write any thing thereof: only let it suffice to speak a little thereof, and being necessary to the knowledge of the foregoing matter, for them that would willingly note how much the Compasse doth vary in severall places of their sayling. I think it best to have the Needles of their Compasses touched upon a good Stone and so placed directly under the N. point of the Fly without allowing any Variation at all, the outer edge of the said Fly to be graduated to each quarter into 90 deg. for the ready reckoning of the deg. that the Compasse doth vary from the true N. or S. either toward the E. or W. or over which Fly, it is necessary to have a round Circle of Wyre with two sights

ſights upon the ſame, the one directly againſt the other at oppoſite points to be raiſed perpendicularly where occaſion ſhall ſerve: which circle, with the ſights thereon as I have ſaid being placed upon the glaſſe, over the Fly, within the box, where the Compaſſe is: when you would obſerve the Variation of the Compaſſe juſt either at the Sun ariſing or ſetting, turn the ſights in the Glaſſe Circle towards the Sun, and looking through the ſame, mark preciſely how many deg. the Sun riſeth or ſetteth from the E. or W. point of the Fly or Compaſſe: For if the Sun be in the Equinoctiall, having then no amplitude, ſo much as is the difference of the Suns riſing or ſetting from the E. or W. points ſhewed by the Compaſſe, is the variation of the Compaſſe from the true E. or W. but if the Sun be either to the Northward or Southward of the Equinoctiall, having amplitude then is there a reſpect alſo to be had to the Suns amplitude: as thus, if the Sun hath North or South amplitude, and that you obſerve the Sun to riſe or ſet ſo much from the E. or W. point of the Compaſſe, as is the Suns amplitude, and likewiſe the ſame way that the amplitude is, then hath the compaſſe no variation: but if the Sun having North amplitude, riſeth notwithſtanding more Northerly by your Compaſſe, then by the ſaid amplitude it ſhould do, the degrees of true amplitude, deducted from the amplitude which the Compaſſe ſheweth, leaves the variation of the Compaſſe to be Eaſtward of the North: but if the true amplitude be greater, then the Compaſſe ſheweth, the one deducted from the other, leaveth the variation to the weſtward of the North: and if the amplitude be Southerly, and the Compaſſe ſhew the Sun to riſe Northerly, both the differences added together gives the variation Eaſterly: or if the Amplitude be Northerly, and the Compaſſe ſhewes it to be Southerly, then both the differences added together, give the variation Weſterly. All this is to be underſtood, when you obſerve by the amplitude Ortive, viz. At the Suns riſing: for if you obſerve the ſetting thereof, then by adding or deducting the differences betweene the true amplitude known, and the Amplitude given by the Compaſſe, the coall or remaine ſhewes the Compaſſe to vary ſo much to the contrary: As an Example will

make all this plain unto you which let it be thus proposed. Suppose that being at Sea, you find by the Table of Hines hereafter set down (or by some other meanes) the Sunne Amplitude at this time to be 20 degrees to the Northward of the East setting the Sunne at his rising by the Compasse (as is before shewed) you find that the Sunne riseth 35 deg. to the Northward of the East, which is somewhat to the Northward of the Northeast and by East point, therefore subtracting 20 deg. the Sunnes true Amplitude from 35 deg. the Amplitude which the Compasse giveth, the Remainder being 15 deg. sheweth the Compasse to be so much varied from the North to the Eastward, which is 1 whole point, & about one third: otherwise the Sun having the same Amplitude Northerly (as is aforesaid) and setting him at his going down by the Compasse, the said Compasse sheweth him to set only 5 degrees to the Northward of the West, which deducted from 20 deg. the true Amplitude leaveth 15 deg. for the variation of the Compasse to the Eastward as before.

As for Example.

Suppose that the Sunne having 23 degrees of South Amplitude and the Compasse sheweth the Amplitude arising to be 21 Degrees Northerly, adde 2 deg. to the true Amplitude, with 21 degrees of contrary Amplitude, which the Compasse sheweth, and the Product 34 degr. being 3 whole points and somewhat more, sheweth that the Compasse is so much varied from the true North to the Eastward.

Againe, the Sunne having the same Amplitude Southerly, you observe at his setting, and find by your Compasse that he setteth 11 deg. Northerly, adding the two Amplitudes as aforesaid, 23 and 11, the Product 34 sheweth the variation so much to the Westward being that in the Observation at his Rising, there and by North points of the Compasse, standeth where the East South-east should be: and at his setting in the other Observation, the West and by North points of the Compasse, pointeth to the Sun, in which place should be the West South-west points.

These few words will suffice, being (that albeit the ignorant they seeme somewhat darke) yet in the practice thereof they shall find it I doubt not, but very plaine and easie for their understanding

ding; otherwise there are sundry sorts of Instruments to find the Variation by, but others having already written thereof, I have thought good also to shew my opinion of this plain and easie way, knowing that the Pariner having made experience of many wayes will only use that which he findeth best, both for their ease, profit, and truth thereof. And note, that whatsoever is here spoken, concerning the finding of the variation by the Amplitude, the very like may be observed by the Azimuth, which by the Sun or Stars being to be seene, may at any time be known.

How many leagues sayling upon any Point of the Compasse, will raise or lay a degree of Latitude, and what departure from the Meridian you make therewith.

This is so common in every Book, that I need not to write thereof, but only being that it is a necessary help to that which hath been before spoken of, it is not amisse to set it heere down, being as followeth.

First, sayling S. or N. you keep still one Peridian: and in sayling 20 English leagues, you either raise or depresse the Pole 1 deg. But if you saile upon the first point or Rombe from N. or S. either Eastward or Westward, you must saile 20 leagues and one third part to raise or lay a degree of Latitude, and so having changed your Parallell 1 deg. you are also departed from your first Peridian 4 leagues, the way which your course was.

Upon the second point or Rombe from N. to S. 21 leagues and one third, raise or lay a degree of Latitude, and your distance from the Peridian, is 8 leagues and one third.

Sayling upon the third point 24 leag. to raise or lay a degree and distance from the first Peridian, is 13 leag. and one third.

* Heere note, that although the Authour hath set downe twenty English leagues, yet it must bee twenty such leagues as answer to one degree of the Meridian; and therefore the knots on the Logline must bee 50 foot a sunder at least, according to the late experiment made by Master *Richard Norwood*, which experiment was formerly verified by practice at Sea, by Captaine *Thomas Jones* in his voyage to the Northwest, as we may see in the 19 Page of his Iournall, by the course, distance, and Latitude, from the Blaskes (on the West of *Ireland*) to *Cape Farewell*, compared with Master *Norwoods* Experiment.

But because many will hardly bee drawne to alter their knots from their old forme. Therefore if any man will multiply 1 1/2 by the knots, run out in halfe a minute, the product, cutting off two figures on the right hand, shall bee the number of leagues run in a Watch, according to Master *Norwood*, Experiment.

Upon

Upon the fourth point 28 leagues and one third, raiſe or lay a deg. of Latitude, and diſtance from the Meridian, is 20 leagues.

Upon the fifth point 36 leagues, raiſe or lay a degree of Latitude, and diſtance from the Meridian, is 30 leagues.

Sailing upon the firſt point or Rombe 52 leagues and one third raiſe or lay a degree, and having altered your Latitude one deg. upon that point, you are departed from the firſt Meridian 48 leag. and one third.

If you ſaile upon the ſeventh point, being the next from the E. or Weſt, you may ſaile 100 leagues and 2 thirds, before you raiſe or lay the Pole one degree, and then are you 101 leagues from your firſt Meridian, but if you ſaile Eaſt or Weſt, then are you ſtill in a paralell, and neither raiſe nor lay the Pole at all.

To find the Diſtance between any two places, knowing the Longitude and Latitude of them.

IF the two places differ only in Latitude, then are they both under one and the ſame Meridian: and to know the diſtance betwixt them in miles or leagues, multiply the number of the deg. of difference by 60 miles or 20 leag. the Product of which multiplication gives the true diſtance between them in miles or leagues according as you worke them, being that 60 miles or 20 leagues make 1 deg. of a great Circle: but if the one place have N. Latitude, and the other S. then adde both their Latitudes together, and worke as aforeſaid: and if both the places are under the Equinoctiall, then have they no Latitude. And there ſhewing 60 miles or 20 leag. makes 1 deg. and the working like the former: if the difference be under 180 deg. If or if the difference be more than 180, ſubtract the ſaid difference from 360, and multiply the remainer by 60 or 20 as before.

Theſe are ſo plain and eaſie that they need no Examples: but if they differ both in Longitude and Latitude, or in Longit. only, in any Paralell beſide the Equinoctiall, the working is ſomewhat more difficult, by reaſon that the further ſ Paralels are diſtant from ſ Equinoctiall towards either of the Poles, the ſhorter they are, & the ſhorter the Paralels are, the fewer min. or miles make

Deg. of Latit.	Min. a Deg.	Deg. of Latit.	Min. a Deg.
0	60	60	30
10	59	61	29
15	58	62	28
18	57	63	27
21	56	64	26
24	55	65	25
26	54	66	24
28	53	67	23
30	52	68	22
32	51	69	21
34	50	70	20
35	49	71	19
37	48	72	18
38	47	73	17
40	46	74	16
41	45	75	15
42	44	76	14
43	43	77	13
44	42	78	12
47	41	79	11
48	40	80	10
49	39	81	9
51	38	82	8
52	37	83	7
53	36	84	6
54	35	85	5
55	34	86	4
57	33	87	3
58	32	88	2
59	31	89	1

a deg. so that whereas in the Equinoctiall 60 min. or miles make a deg. in that Paralell where the Pole is raised 52 deg. 37 min. makes 1 degr. viz. 1 deg. in the Latit. of 52 running in E. or W. answers 1037 miles: for which purpose as also for diverse necessary uses, I have here added a Table shewing the miles of distance and minutes of time answerable to a deg. in every severall degree of Latitude from the Equinoctiall towards either of the Poles: And when you know the miles answerable to a deg. in the Paralell desired, if the difference of the two places be only in Longitude, multiply the difference of their Longitude by the number of miles answerable to a degree: and the Product sheweth the distance in English or Italian miles betwixt the said two places.

Example.

London and Middleborough, have both in a manner one Latit. viz. about 52 deg. and I find in this table, that in the Paralell of 52 deg. 37 miles make a deg. of Longit. the Longit. of London is 2 deg. 50 min. which subtracted one from another leaves 3 degr. 50 min. for the difference of Longitude. Then multiplying 3 deg. by 37 miles, the Product is 111 miles: Then for 50 min. I say by the Rule of 3, If 60 minutes gives 37 miles, what gives 50 minutes. Facit here 31, which added to 111, makes 142 miles, or 47 leagues and a mile, for the distance betwixt London and Middleborough.

But if the two places differ both in Longitude and Latitude, then is the working more difficult then either of the former: For first you must take the difference of the two places in Longit. and then their difference also in Latit. and multiply the deg. of their difference in Latit. by 60, set the Product thereof by it self, for the first number; then multiply the

difference of Longit. by the number of miles anſwerable to each Latit. ſeverally, and adde both the Products together: the halfe whereof ſet down for your ſecond number, and multiplying each of the ſaid two numbers into it ſelfe ſquarely, adde both the Products together, and extracting the ſquare root thereof, the ſaid ſquare root is the diſtance betwixt the two places deſired.

As for Example.

We goe directly in a right Line from Calice in France to Conſtantinople in Grecia: I find by the Tables following, that the Longitude of Calice is 29 deg. 10 min. and the Latitude thereof 50 deg. 40 min. And the Longit. of Conſtantinople is 61 deg. 10 min. and the Latit. 44 degr. 40 min. then ſubtracting the leſſer Longit. from the greater, the Difference of Longitude is 32 deg. 10 min.

Conſtantin.	61 deg.	10 min.	}	Long.
Calice;	29 degrees	10 min.		
Difference,	32 degr.	10 min.		
Calice,	50 degrees	40 min.	}	Latit.
Conſtantin.	44 deg.	40 min.		
Difference,	6 degrees	0 min.		

Alſo I take the one Latitude from the other, and there reſts 6 deg. for the difference thereof; which 6 deg. multiplyed by 60 miles, produceth 360 miles for the diſtance betwixt the Paralell of Calice, and the Paralell of Conſtantinople. Now for the diſtance betwixt Calice, and the Meridian of Conſtantinople, I multiply 32 degrees 10 minutes, the difference of Longitude by 38, the miles anſwerable to a degree in the Paralell of Calice, and the Product is 1222 miles: Then multiply 32 degrees 10 minutes, the aforeſaid difference of Longitude 42 miles anſwering to a degree in the Paralell of Conſtantinople, which Product being 1351 miles, is the diſtance betwixt Conſtantinople, and the Meridian of Calice: Thoſe two diſtances added together make 2573, the halfe

1	2	2	2	
1	3	5	1	
2	5	7	3	
1	2	8	6	

whereof, being 1286 is the meane diſtance betwixt the Meridians of the ſaid two places: So have you two numbers, viz. 360 miles, the Diſtance that the paralell of Conſtantinople is to the ſouthwards of Calice, and 1286 miles the Diſtance that Conſtantinople is to the Eaſtward of the Paralell of Calice: Therefore if you multiply 360 into it ſelfe, the Product is 129600. And likewiſe multiplying 1286 into it ſelfe, the Product

Product is 1653796, which both added together, make 1783396, the square root of which number is the distance desired: Which to help those that are not perfect in extraction of Roots, I have here set downe the working thereof as followeth:

The manner how to Extract the square and Cube root of any number is more plainly taught, toward the end of the Booke.

First, I set down the proposed number with a Quotient, and under the last figure, I put a prick: and so likewise under each other figure toward the left hand leading betwixt each prick one figure unprickt: So have I under this number 4 pricks, signifying that the root must consist of foure Figures, and to find them out, I seeke what is the greatest square number over the first prick, which is 1; therefore I put 1 in the Quotient for the first Figure of the Root and rentell the Figure over the first prick: Then to find the second figure of the root I multiply the quotient by 20, which being 1, doth neither multiply nor divide; therefore I seek how often 20 is contained in 78 the number of the second prick, which you must take no other then that the Square of the said number being added therewith, may be likewise taken there from, so I see 3 times 20 being 60 and the square of 3 which is 9 added therto is 69, which may be taken there from: therefore I put 3 in the quotient, taking 69 from 78, the number over the 2. prick leaves 933 to the 3. prick: then for the third figure of the root I multiply 13 the quotient by 20. the Product is 260, which I seeke how often it may be taken out of 933, and I find that 3 times 260 is 780, whereunto the square of 3, being added makes 789; therefore I put 3 in the quotient, and subtracting 789 from 933, rests 14496, for the 4 prick, then for the last figure of the root, I multiply 133 the whole quotient already found by 20, and the Product is 2660, which may be taken five times in 14496, for 5 times 2660, is 13300, unto which

1783396	1	
	20	
	20	
	3	
	60	
	9	
	69	
1783396	13	
78	69	13
		20
		260
		3
		780
	1	9
933	844	789
1783396	133	
1449		133
	69	20
	789	

25 the Square of 5 added, makes 13325. Therefore I put 5 in the Quotient, for the fourth and last figure of the Root; and making my subtraction as afore, the work will stand as you see, by which you may know the square root of the proposed number to be 1335 and very neere ½. So I conclude, the true distance between Calice and Constantinople to be 1335 miles, and neere ½ mile. The manner how to extract the Root of any number is set down more at large after the tables of Sines.

	789	2660
		5
		13300
211		25
94472	13322	
2783386	1335	
269		
789		
13325		

But for the finding of the Distance of places, here followes an easier way and more naturall by the Table of *Sines*, which will be necessary to make use of the Table of *Longitudes* and *Latitudes*, as also to make tryall of the Difference that is between the true Distance of places as they are upon the *Globe*, and as most of them are laid down upon the plaine *Sea-Card*.

1 IF one place be under the Equinoctiall and the other have Latitude, and their Difference of Longitude be 90 deg. 0 min. then their distance asunder is 90 deg. 0 min.

2 If one place be under the Equinoctiall and the other have Latitude, and their difference of Longitude be more then 90 deg. 0 min. subtract 90 deg. 0 min. from it and seeke the line of the remainer and adde it to 10000, and multiply the summe by the line of the Complement of the Latitude of the other place, cutting off 4 figures to the right hand from the Product, and from the rest subtract the line of the Complement of the Latitude given, and the remainer shall be the line of the Complement of the Distance between the two places, unto the arch of which line adde 90 deg. 0 min. and the whole is the distance required.

But if their difference of Longit. be lesse then 90 deg. 0 min. subtract it out of 90 deg. 0 min. and seek the line of the remainer, and multiply it by the line of the complement of the Latit. given, cutting of 4 figures to the right hand from the Product, and the rest is the line of the complement of the distance between the two places.

3 If

3 If both places have Latitude, adde one Latitude to the Complement of the other, and ſeeke the ſine of the ſumme, which ſine keep. Then if the difference of Longitude be more then 90 deg. 0 min. ſeeke the ſine of the exceſſe above 90 deg. 0 min. and adde it to 10000 which ſum keep, but if it bee leſſe than 90 deg. 0 min. ſeek the ſine of the complement of it, and ſubtract it from 10000. and keep the remainer, next multiply the ſumme kept or this remainer by the ſine of the Complement of one Latitude cutting of 4 figures to the right hand of the Product and the reſt multiply by the ſine of the complement of the other Latitude, cutting off alſo 4 figures to the right hand of the Poduct and take the difference betweene this laſt Product and the ſine of the ſumme of the complement of one Latitude added to the other Latitude, which difference ſhall be the ſine of the Complement of the diſtance betweene the two places.

Note if the laſt Product be equall to the ſine of the ſumme of the complement of one Latitude added to the other Latitude, the two places are 90 deg. 0 min. diſtant aſunder, but if it be leſſe than the ſaid ſine, they are leſſe than 60 deg. 0 min. aſunder, but if it be more than the ſaid ſine, then the former difference is the ſine of the exceſſe above 90 deg. 0 min. unto which adde 90 deg. 0 min. and the whole is the diſtance required.

Example of the 2.

The Iland of S. Thomas under the Equinoctiall, Longit. 38 d. 0 min. and Iava minor Longit. 151 deg. 0 m. and Latit. 8 deg. 0 m. difference of the Longit. 113 deg. 0 min. the exceſſe above 90 deg. 0 min. is 23 deg. 0 min. the ſine 3908 which added to 10000. the ſum is 13908. the Complement of the Latit. given 81 deg. 0 min. the ſine is 9903 which multiplyed bee 13908 the Product is cutting off 4 figures to the right hand 13773, from which ſubtract 9903 the ſine of the Complement of the Latitude the remainer is 3870 the ſine of 22 deg. 46 min. unto which adde 90 deg. 0 min. and the whole is 112 deg. 46 min. which multiplyed by 60 and the 46 minutes added, is 6766 miles, the diſtance of the two places.

Example of the 3.

Nova Zembla Longit. 83 deg. 29 min. and Latit. 74 deg. 0 min.

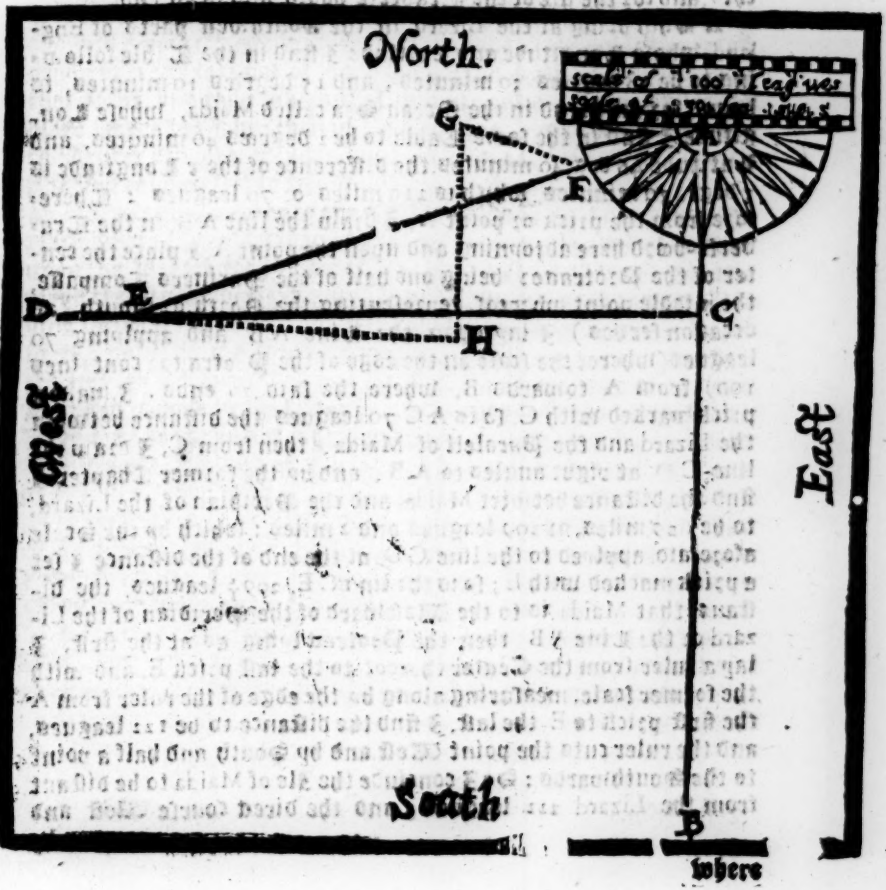
and new Plymouth in new England Longit. 315 deg. 0 min. and Latit. 41 deg. 37 min. leſſer Latit. added to the Complement of the greater, the ſumme is 57 deg. 37 min. whoſe line is 8445, the Difference of Longit. 128 deg. 19 min. the exceſſe above 90 deg. 0 min. is 38 deg. 29 min. whoſe line is 6223, which added to 10000, the ſumme is 16223. Which multiplyed by 7476 the line of the Complement of 41 deg. 37 min. thy Product is 121328. And this multiplyed againe by 2756, the line of the Complement of 74 deg. 0 min. the laſt Product is 33421, which ſubtracted from the line of the ſumme of one Latit. added to the Complement of the other Latitude, viz. the line of 57 deg. 37 min. that is 8445 and the remainer is 51103, the line of 30 deg. 41 min. whoſe Complement is 59 deg. 19 min. which being multiplyed by 60, makes 3559 miles, the diſtance required.

The ingenious Mariners may faile by knowing the true Longitude & Latitude of places, to any place aſſigned aſwell by a blank of paper or paſt board as by his Sea-Card by the help of a Protractor in this manner: Firſt upon the board or paper lined with Meridians and Parales or to them can make a right Angle upon any prick or Point a ſheet of cleane paper is ſufficient to keep a Traverſe upon: To know your courſe from the place where you are to any other place aſſigned according to the plain Sea-Card as I ſay: upon your board or paper make a prick for the place where you the are, & from the ſaid prick draw a right line to repreſent the Meridian of the ſame place. Then placing the Center of the Protractor upon the ſaid prick lay the N. or S. point of the Fly or Protractor as the place beareth, upon the line ready drawn. Then by the laſt Chapter learne the diſtance of miles betwixt the place where you are, and the Paralell of that place you are bound to: or more briefly, what portion of the Meridian is compriſed betweene the Latit. of the two places: that diſtance by ye ſcale of the protractor, apply to the Meridian by you drawn and where the diſtance ends, draw another line ſquare or at right angles to the other either Eaſt or Weſt, as the ſituation of the place aſſigned requireth: and by the former Chapter learne the diſtance betwixt the Meridian by you drawn, and the Meridian of the other place aſſigned: which

known

known (by your Scale) aprly that diſtance to your line of Eaſt or Weſt, and where that number of diſtance ends, make another prick for the true ſcituation of your place aſſigned: then laying a thin or Ruler from the Center of the Protractor, being the place.

Type of a Traverſe-boord and a Protractor.



where you are, and extending it to the other prick last made, the edge of the Ruler or line shewes upon the Protractor the point of the Compasse that the place assigned beares from the place where you are: and the Scale applyed to the said line or edge of the ruler, shewes the distance; also the distance may be knowne by extracting the square Root, as is before shewed in an Example of this, and for the use of the Traverse board, and so an end.

A Ship being at the Lizard, in the South-west parts of England, whose Longitude and Latitude I find in the Table following to be 18 degrees 30 minutes, and 15 degrees 10 minutes, is bound for an Iland in the Ocean Sea called Maida, whose Longitude I find in the same Table to be 2 degrees 40 minutes, and Latitude 46 deg. 40 minutes, the difference of their Longitude is 3 degr. 30 minutes, which is 210 miles, or 70 leagues: Therefore from the prick or point A, I draw the line A B, in the Traverse-board here adjoyning and upon the point A, I place the center of the Protractor, being one half of the Mariners Compasse, the middle point whereof representing the North or South, (as occasion serves) I lay upon the Line A B and applying 70 leagues (whereof the scale on the edge of the Protractor contines 100) from A towards B, where the said 70 ends, I make a prick marked with C, so is A C 70 leagues the distance between the Lizard and the Paralell of Maida, then from C, I draw the line C D, at right angles to A B, and by the former Chapter I find the distance betwixt Maida, and the Meridian of the Lizard, to be 629 miles, or 209 leagues and 2 miles: which by the Scale aforesaid, applyed to the line C D at the end of the distance I set a prick marked with E; so is the line C E, 209⅔ leagues, the distance that Maida is to the Westward of the Meridian of the Lizard or the Line A B. then the Protract lying as at the first, I lay a ruler from the Center thereof to the last prick E, and with the former scale, measuring along by the edge of the ruler from A the first prick to E the last, I find the distance to be 222 leagues, and the ruler cuts the point West and by South and half a point to the Southwards: So I conclude the Ile of Maida to be distant from the Lizard 222 leagues, and the direct course West and by

by South, and halfe a point Southwards.

But if the wind be scant or contrary, so that you cannot saile by the direct course; then must you keepe a reckoning how many leagues you saile upon every other point; and where you change your course, there place the Center of the Protract keeping the Meridian, or North and South line of the Protractor Paralell to the Meridian drawn on the Traverse-bord and laying a ruler from the Center of the Protractor, along that point upon which the Ship maketh her way, and to the edge of the ruler so placed, apply so many leagues of the Scale as the Ship hath sailed upon that point, and then where that number ends, set a point for the place where the Ship then is; and againe, upon that prick place the Center of the Protractor lying as before the South and North line thereof paralell to the Meridian, or South line first drawn, and then laying a ruler to the Center of the Protractor being the place where the Ship then is, and to the place assigned, it shewes upon the Protractor, the point how they beare and the Scale applyed thereto shewes the distance as in the former Example; Having sailed from the Lizard in the right course 50 Leagues being in the point F, the wind commeth to another point, so that she maketh her way West and by North 40 Leagues; at the end of which course is the letter G, from thence she runneth S. 70 Leagues; at the end of which course is H, then from H, to know the distance, and in that course must he kept to the prefixed place of Maida marked with E, I place the Center of the Protractor upon H, and the edge thereof which is then North and South, Paralell or equidistant to the first line A B, which so placed, I lay a ruler from the Center thereof to E, and I find the course to be West, and halfe a point to the North 105 Leagues.

Note that it is necessary to have upon your Protractor two severall Scales, a greater and a lesser, for the greater the Scale is you keep your reckoning by, the truer shall your accompt be.

Necessary Questions of Navigation, with their Answers.

Quest. 1.

IF I saile from the Paralell of 50 degrées 70 leagues upon a Southwest course, I demand how much I lay or deprelle the Pole, and how many degrées, and leagues I depart from the Meridian?

Answ. Pole deprelled 1 deg. 18 min. difference of Longitude 3 deg. 51 min. leagues from the Meridian 49 and ½.

Q. 2. If I saile from the Paralell of 40 degrées upon a West Northwest course, untill I raise the Pole 3 degrées 30 min. I demand how many leagues I have sailed? And how many degrées and leagues I have departed from the Meridian?

A. Leagues sailed 183, difference Longitude 4 deg. 26 min. leagues from the Meridian 169.

Q. 3. From the Paralell of 47 deg. if in sailing 208 leagues between West and North I raise the Pole 2 deg. I demand upon what Rombe I have sailed? As also how many deg. and leagues I am from the Meridian, from whence I began the Course?

A. A Rombe Northwest and by West, difference Longitude 6 deg. 47 min. leagues from the Meridian 90.

Q. 4. If from the Paralell of 50 deg. I saile so long betwixt North and East, till I raise the Pole 6 deg. difference of Longitude 4 degrées? I demand upon what point of the Compasse I have sailed, and how many leagues I have runne?

A. The Course is nære N. N. East, leagues sailed 150.

Q. 5. If from the Paralell of 50 degrées I saile Northwest untill the difference of Longitude be 4 degrées? I demand how many leagues I have sailed, and how much the Pole is raised?

A. Leagues sailed 70 and two thirds, Pole raised 2 deg. ½.

Q. 6. Two ships departing from one place of the Paralell of 50 degrees, the one in sailing 145 leagues towards the West hath

hath raised the Pole 4 degr. and the other hath raised the Pole 7 degr. and is 95 leagues West from the Meridian of the place from whence he began his course; I demand by what course the said ships have sailed, how many leagues the 2 ships have sayled, how farre they are asunder, and by what course they may meet?

A. The first ship hath sayled Northwest and by west: the second hath sayled Northwest by North 160 leagues, they are asunder 65 leagues and a half, and the course betweene them is N. Northeast and South southwest, more o degr. 55 min. East, and o deg. 55 min. West.

Q. 7. Two Ships departing from one place in the Paralell of 60 degrees, the one in sayling 145 leagues towards the West, hath raised the Pole 4 degr. and the other hath raised the Pole 7 deg. and is 95 leagues West from the Meridian of the place from whence he began that course: I demand by what course the said Ships have sayled, the way of the two ships how farre they be asunder, and by what course they may meet?

A. The first ship hath sayled Northwest and by West, the second hath sayled Northwest and by North 168 leagues, they are asunder 66 leagues Easterly; Course betweene them is North northeast ½ points Easterly.

Q. 8. Two ships sayling from one place in the Paralell of 60 deg. the one sailing 180 leagues Eastwards, hath raised the Pole 5 degr. I demand upon what Course, and how many leagues the ship shall sayle to bring himselfe 50 leagues North by West from the first Ship, and what they are both departed from their first Meridian?

A. The first ship hath sayled Northeast and by East, and is departed from the Meridian 14 leagues. The second ship must saile Northeast 2 deg. northerly, 104 leagues, and is departed from the Meridian where he began his course 139 leagues, and 9 tenths.

Q. 9. If I sayle from the Paralell of 50 degr. 100 leagues North, I demand what Latitude I am in?

A. In the Latitude of 52 degrees.

Q. 10. If I sayle from the Paralell of 50 deg. South, till I lay the Pole 5 deg. I demand how many leagues I have sayled?

A. 100 Leagues.

Q. 11. If from Longitude 22 degr. I sayle in the Parelell of 60 deg. 100 leagues East, I demand what Longitude I am in?

A. In Longitude 52 degrees.

Q. 12. If from Longitude 22 degr. I sayle in the Parallell of 50 deg. to Longitude 10 deg. I demand how many Leagues I have sayled?

A. Leagues 153 and a halfe.

Q. 13. If I sayle from Longitude 20 degr. and Latitude 40. to Longit. 350 deg. 27 min. and Latit. 30 degrees, I demand the Rombe and distance?

A. Course West southwest, distance 521 leagues.

Q. 14. From Longitude 20 deg. and Latitude 45 degr. North-east 20 leagues, what Longit. and Latit. hath the second place?

A. 20 Degr. 45 min. Longitude, 45 degr. 42 min. Latitude.

Q. 15. From Longitude 23 deg. and Latitude 45 deg. 42 min. East and North 30 leagues, what Longit. and Latit. hath the second place?

A. 125 Degr. 55 min. Longitude, 46 deg. Latitude.

Q. 16. From Longitude 25 degr. 9 min. and Latitude 45 deg. 59 min. East southeast 25 leagues. What Longitude and Latitude hath the second place?

A. 27 Deg. 33 min. Longitude, 45 deg. 31 min. Latitude.

Q. 17. From Longitude 27 deg. 33 min. and Latitude 45 deg. 31 min. North 40 leagues. What Longitude and Latitude hath the second place?

A. Longitude 27 deg. 33 min. Latitude 47 deg. 31. min.

Q. 18. From Longitude 27 deg. 33 min. and Latitude 47 deg. 31 min. 50 leagues West northwest. What Longit. and Latit. hath the second place?

A. Longitude 14 degr. 23 min. Latitude 48 deg. 28 min.

Q. 19. From Longitude 23 deg. 57 min. and Latitude 48 deg. 28 min. East northeast 60 leagues. What Longitude and Latitude hath the second place?

A. Longitude 28 degrees 23 minutes, Latitude 49 degr. 36 minutes.

Here

Here followeth a brief Table of *Sines* for Arithmeticall calculation, the totall *Sine* whereof is 10000, with certain necessary Propositions to bee wrought thereby, by which few things proposed, and Examples thereto annexed, any one that hath eyther an ingenious Spirit, or a willing mind to the Practice of the Mathematicall Sciences, may attaine to much knowledge therein.

A brief Declaration of the same.

WHat the Table of Sines is, hath been very learnedly explained by others, and therefore needlesse is it for me to discourse thereof; onely take these few Instruments for the help of those, which as yet have no knowledge thereby. First know that Sayling which is the principall thing here aymed at, is performed by a true and perfect knowledge of the Spheare, by the projection whereof all Calculations, Tables calculated and Instruments for Observation are invented, contrived, framed and made.

WHat the Spheare is I need not to discusse, the chiefe or great Circles thereof consisting of 360 degrees, and one quarter thereof being 90 deg. which quarter being taken from the whole Circumference, consisteth of these three particulars, viz. An arch, or part of a Circle being indeed 90 deg. or a quarter of the whole Circle, a right Angle, and two equall sides thereto, of which the one is the base or ground Line, the other a perpendicular let fall thereon at right Angles, the utmost end or extentions, of which two lines are the limits of the aforesaid Arch, or quarter of a Circle: the which three parts so fitted together in their due order, sheweth the perfect platforme of 1. quarter of the whole Circle, cõmonly called a Quadrant: the base or ground line whereof being divided into 10000 equall parts, is Sinus totus, or the whole Sine: and the whole arch or quarter of a Circle into 90 degrees, is the whole Arch belonging to the said whole Sine.

WIthin which Quadrant, any number of deg. or min. counted from the beginning or 1. perpendicular may be called an Arch or

the aforesaid base or ground line, the number of equall parts that the said perpendicular falleth upon, is the right sine to the arch given: & the complement of the Arch given, is the remainer thereof, it being taken from 90 deg. of the whole Quadrant. To find out the right sine of any given arch, look in the head of the Table following for the deg. thereof, & if there be any minutes therwith, look for the minutes at the left side of the Table, & carrying your eye downward from the deg. till you come right against the min. the number which you find in the common Angle to them both, is the right sine of your given arch desired: as if you desire the sine of 35 deg. 20 min, looke in the head of the Table for 35 and upon the left side thereof for 20, and in the common square or angle right against them both you shall find 5783 which is the sine of 35 deg. 20 min. and if you subtract 35 deg. 20 min. from 90 deg. the remainer 54 deg. 40 min. is the complement therof, whose right sine (found as before is taught) is 8158. what the versed sine is, and how found out, is afterward shewed. I doubt not, but these few words will suffice for the explaining of the Table following, whose large and ample uses for Navigation, and other the Mathematicall practises, these following exemplary Propositions, will in some reasonable sort make manifest: by which few here proposed and answered, the ingenious may gather the manifold uses therof, being that indeed the benefit to be reaped therby is great, & the propositions to be wrought therby infinite. Who so desires more perfection of this kind of Navigation, & generally in all Mathematicall practises, let them spend some time in the study of Pitiscus: of the Doctrine of Triangles, not long since translated and published in our English tongue by Mr. Ralph Handson.

Certaine Propositions to be wrought by the Table of Sines.

The Sunnes true Place being known, to find his Declination. Prop. 1.

As the whole sine is to the sine of the greatest declination, so is the sine of the Sunnes distance from the neerest Equinoctiall point, to the sine of the declination for the day proposed.

Example.

I would know the Declination of the Sun the 1 of May, 1630

At

at what time the true place of the Sun being in 20 deg. 36 min. of Taurus, is 50 deg. 36 min. from the beginning of Aries, or the vernall Equinoctiall point; therefore I must multiply the sine of 50 degr. 36 min. the Suns distance from the Equinoctiall point by the sine of 23 degr. 31 min. the greatest Declination, and that product must be divided by the whole sine whose severall Sines being found out in the Table following, and set in order, the work will stand thus,

If 90	give	23.31	what	50.36
10000		3990		7727

Facit, 3083, whose nearest Arch 17 degr. 57 min. is the true Declination of the Sunne, the day and peare aforesaid.

The Declination of the Sunne given, to find his Place in the Zodiack. Prop. 2.

As the sine of the greatest Declination is to the whole sine, so is the sine of the Declination for the day proposed to the Suns place, or distance from the nearest Equinoctiall point.

Example.

The first of May 1626, I find that the Declination of the Sunne is 17 degr. 57 minutes North; therefore I say:

If 23.21	give	90	what	17.57
3990		10000		3083

Facit, nearest 7727, whose arch 50 deg. 36 min. is the Sunnes distance from the vernall Equinoctiall point of Aries, from which taking 30 degr. the whole sine of Aries, the remainer 20 degr. 36 min. shewes the Sunne to be so much entred into Taurus, which is the next Sine.

The Latitude and Declination of the Sunne given, to find the Amplitude. Prop. 3.

As the sine of the Complement of the Latitude is in proportion to the whole sine, so is the sine of the Sunnes Declination to the Amplitude.

Example.

The 10 of April 1628, I desire the Amplitude of the Sunne, viz. How much the Sun doth rise, and set from the true East and

West point of the Horizon, towards the North or South in the Latitude of 51 deg. 40 min. to know which the work is thus.

If 38 deg. 20 min. the Complement of the Latitude, give 90 degrees the arch of the whole line, what gives 11 degr. 48 min. the Declination of the Sunne.

38 deg. 20 min. 90 11, 48 minutes.

6802 10000 2043

Facit, 3297 nerest whole arch sought out in the Table of lines, is 19 degr. 15 min. for the Amplitude of the day, neere and place proposed: the same divided by 2 and 1 quarter, the number of degrees that belongs to a point of the Compasse, the with one point and 5 deg. which the Sunne riseth and sets to the Southward of the East and West being that the Declination is North, for if the Declination were South, then were the Amplitude Southerly.

The Declination and Amplitude of the Sunne given, to finde the height of the Pole.

Prop. 3.

As the line of the Amplitude is in proportion to the line of the Declination, so is the whole line to the line of the Complement of the Latitude.

Example.

The Declination 11 deg. 43 min. and the Amplitude 19 deg. 7 minutes, I demand the height of the Pole? Say,

If 19.7 give 11.43 what 90

3275 2031 10000

Facit, 6202 nerest whole arch in the Table of lines being 38 degrees 40 min. is the height of the Equinoctiall or the Complement of the Latitude: That subtracted from 90 degrees leaves 51 degrees 40 minutes, for the height of the Pole, or Latitude of the place desired.

The true place and Declination of the Sunne given, to finde the right Ascension. Prop. 5.

As the line of the Complement of the Declination is to the totall line, so is the line of the Complement of the Sunne distance from the beginning of Aries, so the Complement of the right Ascension.

Exam-

Example.

I desire the right ascension of the Sun the 20 of April, 1629 being then in 10 deg. 14 min. of Taurus, at which time his declination is 14 deg. 56 min. and the complement thereof 75 deg. 4 min. and the distance from the beginning of Aries 40 deg. 14 min. whose complement is 49 deg. 49 minutes: I say then

If	75.4	give	90	what	49.46 minutes:
	9663		10000		7934

Facit, 7900. whose arch in the Table of Sines is 52 Degrees 11 min. the complement whereof 73 deg. 49 min. is the Suns right ascention: the same converted into houres by allowing 15 deg. to an houre, gives 2 houres 31 minutes.

This is to be understood, when the Sunne is betwixt the beginning of Aries, and the Tropick of Cancer for if the Sunne be in the Tropick of Cancer, then is the right ascension 90 deg. 06 houres: and if the Sunne be betwixt the Tropick of Cancer and the Equinoctiall point of Libra subtract the distance that the Sun is from the beginning of Aries, out of 180 degrees, and with the remainer work as before for the right ascension which ascension so found, take from 180 and the remainer is the right ascension desired. But if the Sun be betwixt the Equinoctiall of Libra, and the Tropick of Capricorne, subtract the said distance from the beginning of Aries out of 270 degrees, and if betwixt the Tropick of Capricorne, and the beginning of Aries, take the said distance out of 360 degrees, and then work as before. One Example of two will make all this plain unto you.

The last of June 1630, the true place of the Sun 17 degrees, 57 min. of Cancer, is 107 deg. 51 minutes from the beginning of Aries, which taken from 180 leaves 72 deg. 9 minutes, whose complement is 17 degr. 51 minutes. the Sunnes Declination being then 22 degr. 20 min. the complement thereof 67 degr. 40 minutes. Say then

If	67.40	give	90	what	17.51. minutes:
	9250		10000		3065.

Facit, 3314 whose arch is 19 deg. 21 min. the complement whereof 70 deg. 39 min. taken from 180 leaves 109 deg. 21 min. for the

right aſcenſion deſired, which converted into houres, makes 7 houres 16 minutes. Again, I deſire the right aſcenſion of 20 deg. 40 min. of Capricorne, whoſe diſtance in continuall proceeding from the beginning of Aries, being 290 deg. 40 min. taken from 360 leaves 69 deg. 20 minutes, with the Complement whereof 20 deg. 40 min. and the Complement of the Declination of the Sunne upon the ſame point of the Sunnes place 68 deg. 6 min. I worke as followeth.

If	68,6.	give	90 -	what	20.40
	9278		19000		3529.

Facit, 38,3. whoſe arch is 22 degr. 21 min. the Complement whereof 67 deg. 39 min. taken from 360. leaves 292 deg. 21 min. for the right aſcenſion deſired, the ſame converted into houres, is 19 houres 29 minutes.

The Latitude and Declination of the Sunne known, to find the difference aſcentionall.

Prop. 16.

AS the ſine of the complement of the Latitude is to the ſine of the Latitude ſo is the ſine of the Declination to the quotient found: againe, as the ſine of the complement of the Declination is to the whole ſine, ſo is the ſaid quotient found to the difference aſcenſionall.

Example.

I would know the difference aſcenſionall, when the declination is 20 deg. 6 min. and the Latitude 51 degrees 40 minutes, I ſay,

If	38.20	give	51.40	what	20.6
	6102.		7844		3437

Facit, 4346. for the quotient found: then againe, I ſay,

If	62.54	give	90	what	
	9392		10000		4346.

Facit, 4627. whoſe arch in the Table of ſines, 27 deg. 34 min. is the difference aſcenſionall for the day propoſed: the ſame reduced into houres and minutes, makes one houre and 50 min. which taken from 6 a clocke, the houre that the Sunne riſeth, being in the Equinoctiall, leaveth 4 houres 10 minutes, at what time the Sunne then riſeth, and the ſaid aſcenſionall difference added

to

to 6 a clock, makes 7 a clock, 50 minutes, for the Sunne setting. Againe, the said ascensionall difference doubled and added to 12 houres, the time from 6 in the morning till 6 at night, makes 15 houres 40 min. for the whole length of the day.

This is when the Sunne hath North Declination, for if the Declination be South, then the ascensionall difference added to 6 a clock gives the Suns rising and taken from 6, leaves the setting, and being doubled and taken from 12 houres, leaves the length of the day, as aforesaid.

The Amplitude and difference ascensionall of the Sunne or Starres given, to find the Declination.

Prop. 7.

As the sine of the time of the Sunnes rising, converted into degrees and minutes, is to the sine of the complement of the Amplitude, so is the whole sine to the sine of the complement of the Declination.

Example.

The difference ascensionall being 27 deg. 34 min. shewes the Sunne to rise at 4 a clock 10 min. which converted into degrees, makes 62 deg. 30 min. and the Amplitude being found as before is shewed in the third Proposition, is 33 deg. 38 min. and the complement thereof 56 deg. 22 min. Say then

If 62.30 gives 56.22 what 90

8870 8326 10000

Facit, 9386, whose arch 69 deg. 50 min. the complement thereof 20 deg. 10 min. is the Declination desired.

The Latitude and Declination given, to find the Meridionall Altitude.

Prop. 8.

If the Sun haue North Declination, adde the complement of the Latitude with the Declination, the product is the Meridionall Altitude.

Example.

If the Declination, be 23 deg. 30 min. North, and the Latitude 51 degrees 40 minutes, the complement thereof 38 degrees, 20 min. added with 23 deg. 30 min. makes 61 degrees 50 minutes,

for the Meridian Altitude: but if the Declination be 23 deg. 30 min. South and the Latitude 51 degrees 40 minutes, I abstract 23 degrees 30 minutes, the Declination from 38 degr. 20 minutes, the complement of the Latitude and the remainer 14 deg. 15 min. is the altitude desired: and if the Sun be in the Equinoctiall having no Declination, then is the Meridian altitude equall to the complement of the Latitude.

The Latitude and Declination known, to find the height of the Sunne at any houre of the day.

Prop. 9.

FIrst you are to consider, whether the Sun be in the Equinoctiall or whether he hath North or South Declination for if the Sunne be in the Equinoctiall then as the whole sine is to the sine of the complement of the Latitude, so is the sine of the complement of the Sunnes distance from none, allowing 15 deg for every houre to the sine of the altitude desired.

Example.

At any time of day, the Sunne then having no Declination, the Latitude 51 deg. 40 min. I desire the Suns height at 9 aclock before none, or at 3 afternone, the complement of the Latitude is 38. deg. 20 minutes, and the houres distance from none, 45 deg. whose complement is also 45 deg. Say then

If	90.	give	38.20	what	45
	10000		6201		7071

Facit, 4385 whose arch 26 deg. is the height of the Sun above the horizon, the time and place proposed.

If the Sun have Declination, then is the working somewhat more, except onely at 6 aclock, either before or afternone: for which houre, as the whole sine is to the sine of the Latitude, so is the sine of the Declination to the sine of the Altitude.

Example.

The 10 of Aprill 1624, the Latitude 51 deg. 40 min. and the Declination 11 deg. 48 min. Say,

If	90	give	51.40	what	11,48
	10000		7844		2045

Facit, 1604. whose arch 9 deg. 14 min. is the Altitude desired.

But

But for any other houre of the Day worke as followeth: If it be in the forenoone subtract the houre given out of 12 houres and reduce the remainer into Degrees and if the remainer be lesse then 6 houres, seeke the sine complement of it and subtract it out of 10000 and keepe the remainer, but if the former remaine bee more then 6 houres, subtract 6 houres from it, and keepe the sine of the remainer and adde it to 10000 and keepe the summe: Then multiply the first remaine kept, or this last summ kept by the sine of the complement of the Declination, cutting off 4 figures to the right hand from the Product, and multiply the Product by the sine of the Complement of the Latitude, cutting off also 4 figures from the right hand from the Product, and this last Product subtract from the sine of the Meridian Altitude of the Sunne, and the remainer is the sine of the Suns Altitude required.

You are to note, if the Houre given be afternoone, you must take the houre given it selfe and observe as before, whether it be more or lesse then 6 houres.

Example.

Any Day or Yeare at 9 of the clock Latitude 51 deg. 30 min. Declination 11 deg. 43 min. North subtract 9 from 12, the remainer is 3, that being reduced is 45 deg. 0 min. whose sine complement is 7071, which subtracted from 10000, the remainer is 2928, which multiplyed by 9791, the sine complement of the Declination 78 deg. 17 min. the Product is 2867, and this product multiplyed by 6225, the sine complement of the Latitude; the last Product is 1784. Now the Meridian Altitude is 50 deg. 13 min. whose sine is 7685, from which subtract the former number, the remainer is 5901, the sine of 36 degrees 9 min. the Sunnes Altitude required.

To find the Sunnes Azimuth having the Declination and Altitude of the Sunne, and the height of the Pole given.

Prop. 10.

ADde the Complement of the Latitude to the Sunnes Altitude, and from the sine of that summe, subtract the sine of

the Sunnes Declination and kéep the remainer, when the Sun hath North Declination; but if the Sunne have South Declination, adde the sine of the Declination to the sine of that summe, and kéep the whole summe, which remainer or summe multiply by 10000 for the dividend, and multiply the sine of the Complement of the Sunnes altitude by the sine of the complement of the Latitude for the Divisor, cutting off 4 figures to the right hand from the Product, by which Divisor divide the former dividend, and if the Quotient bee lesse than 10000, subtract it from 10000, and the remainer is the sine of the Azimuth from the East or West northwards: but if the Quotient be more than 10000, subtract 10000 from it, and the remainer is the sine of the Azimuth from the East or West Southwards.

Note if the Sunne have no Declination, then the sine of the summe of the Sunnes Altitude and the complement of the Latitude, must be multiplyed by 10000 for the Dividend, and the divisor must be as before.

Example.

The Sunne having 13 deg. 0 min. North Declination in Latitude 51 deg. 30 min. being 43 deg. 0 min. high in the fore-noon, I demand the Azimuth. The summe in the Sunnes altitude and the Complement of the Latitude 81 deg. 30 min, the sine 9890. and the sine of the Declination 2249 the difference 7644. which multiplyed by 10000 for the dividend, is 76440000, the sine of the Complement of the Altitude is 7313, which multiplyed by 6225, the sine of the Complement of the Latitude, the Product is 4552, for the Divisor of the Quotient is 16786, from which 10000 subtracted, the remainer is 6789. the sine of 42 deg. 44 min. the Sunnes Azimuth from the East Southwards.

The Latitude given, to find how many Minutes or Miles of the Equinoctiall makes a degree of Longitude in any Paralell.

Prop. 11.

As the whole sine is in proportion to 60, so is the sine of the complement of the Latitude to the miles answerable to a degrée in the Latitude desired.

I desire to know how many miles, in running East or West in the Latitude of 51 deg. 40 min. will alter one degree of Longitude? Say,

If 90 give 60 what 38.20
10000 6002

Facit, 37 for the number of miles answerable to a degree in the Latitude desired.

The Course and Distance given, to find out the Difference of Latitude.

Prop. 12.

As the whole line is to the miles of way run, so is the line of the Courses distance from East or West, to the minutes of difference of Latitude.

Example.

Running West Southwest, which is 22 deg. 30 minutes from the West 75 leagues, or 225 miles, I demand the difference of Latitude? Say,

If 90 give 245 what 22,30
10000 3827

Facit, 86 minutes, or one degree 26 min. for the difference of Latitude upon the said Course and Distance.

By Course and Distance given, to find the Difference of Longitude.

Prop. 13.

As the whole line is to the miles of way that you have runne, so is the line of the degree that your course is distant from South or North to the miles that you are departed from your first Meridian.

Example.

Running Northwest and by North which is 33 deg. 45 min. from the North 60 leagues or 180 miles, I demand the difference of Longitude? Say,

If 90 give 180 what 33,45
10000 5556,

Facit, 100 miles which you are departed from the Meridian to the Westward, which if you divide by the number of miles answerable

rable to a degree of Longitude, in the Latitude where you then find your selfe to be, the Quotient gives you the deg. and min. of the difference of Longitude.

By the distance and departure from the Meridian given, to find the Course.

Prop. 14.

As the Miles of distance that you have run, is in proportion to the whole line, so is the Miles of your departure from the Meridian to the line of your Course from South or North.

Example.

Being departed from the first Meridian 75 miles in the running of 50 leagues, or 150 miles, I demand upon what point I have sailed, it being betwixt South and West: Say

If 150 give 10000 what 75

Facit, 5000, whose Arch 30 deg. is the distance from South towards West, that the Course is, which is Southwest and by South Southerly.

The Latitude, Declination, and height of the Sunne given, to know the Houre of the day.

Prop. 15.

Subtract the line of the Sunnes Altitude given, out of the line of the Sunnes Meridian Altitude (you may find the Meridian Altitude by the eighth Proposition fore-going) and multiply the remainer by 10000 for the Dividend, and multiply the line of the complement of the Sunnes Declination by the line of the Complement of the Latitude for the divisor, by which divisor, divide the former dividend, and if the Quotient be more than 10000, subtract 10000 from it, and the remainer is the line of the houre wanting of 6 in the Fore-noone, or the houre past 6 in the Afternoone; but if the Quotient bee lesse then 10000 subtract it from 10000, and the remainer is the line of the houre past 6 in the fore-noone, or wanting of 6 in the afternoone.

Example.

Example.

In Latitude 51 degr. 30 min. the Declination 15 deg. 0 min. North, the Altitude 43 deg. 0 min. in the forenoon, I demand the houre of the day. The meridian Altitude 53 deg. 30 min. the fine 8038, and the fine of the Altitude given 6820, the difference 1218, which multiplyed by 10000, is 12180000 for the Dividend, the fine of the complement of the Declination 9659, which multiplyed by 6225 the fine of the Complement of the Latitude, the Product is 6012 for the Devisor, and the Quotient is 2025, which subtracted from 10000, the remainer is 7975 the fine of 52 degr. 53 min. the houre past 6 in the morning, which being reduced, is 3 houres 31 $\frac{1}{2}$ minutes, and added to 6 makes 9 of the clock and 31 $\frac{1}{2}$ minutes the houre of the Day.

To find the *Sinus versus* of any given Arch.

Prop. 16.

If the Arch given be lesse then 90, subtract it from 90, and the fine of the remainer taken from the totall fine leaves the Sinus versus; but if the given Arch be greater then 90 deg. subtract 90 deg. therefrom, and seeke the fine of the remainer, which is alwayes the Complement of the given Arch: which Sinus adde to the whole fine, and the totall thereof is the Sinus versus of the given Arch desired.

Example.

To know the Sinus versus of 47 degr. 12 min. the Complement thereof is 42 degrees 48 minutes, whose fine 6794, taken from 10000, the whole fine resteth 3206, the reversed fine of 47 degr. 12 minutes.

Likewise: to know the reversed fine of 137 deg. 25 minutes, which is more than 90 degr. taking 90 therefrom, there resteth 47 degrees 25 minutes, the Sinus whereof 7363, added to the whole fine, maketh 17363 for the reversed fine of 137 degrees 25 minutes.

A Table of Sines.

The Degrees of the Quadrant.

M.	0	1	2	3	4	5	6	7	8	9
1	3	177	352	526	700	874	1048	1222	1395	1567
2	6	180	355	529	703	877	1051	1224	1398	1570
3	9	183	358	532	706	880	1054	1227	1400	1573
4	12	86	61	35	09	83	57	30	03	76
5	14	89	63	38	12	86	60	33	06	79
6	17	92	66	41	15	89	63	36	09	82
7	20	95	69	44	18	92	65	39	12	84
8	23	98	72	47	21	95	68	42	15	87
9	26	201	75	49	24	97	71	45	18	90
10	29	04	78	52	26	900	74	47	21	93
11	32	06	81	55	29	03	77	50	24	96
12	35	09	84	58	32	06	80	53	26	99
13	38	12	87	61	35	09	83	56	29	1601
14	41	15	90	64	38	12	86	59	32	05
15	44	18	93	67	41	15	89	62	35	08
16	46	21	95	70	44	18	91	65	38	10
17	49	14	98	73	47	21	94	68	41	13
18	52	27	401	76	50	24	97	71	44	16
19	55	30	04	78	53	27	100	73	46	19
20	58	33	07	81	56	30	03	76	49	22
21	61	35	10	84	58	82	06	79	52	25
22	64	38	13	87	61	35	09	82	55	27
23	67	41	16	90	64	38	12	85	58	30
24	70	44	19	93	67	41	15	88	61	33
25	73	47	22	96	70	44	18	91	64	36
26	76	50	25	99	73	47	20	94	67	39
27	78	53	27	602	76	50	23	97	69	42
28	81	56	30	05	79	53	26	99	72	45
29	84	59	33	08	82	56	29	1302	75	48
30	87	62	36	10	85	59	32	05	78	50

A Table of Sines.

The Degrees of the Quadrant.

M.	0	1	2	3	4	5	6	7	8	9
31	90	265	439	613	787	961	1135	1308	1481	1653
32	93	268	442	616	790	964	1138	1311	1484	1656
33	96	270	445	619	793	967	1141	1314	1487	1659
34	99	273	48	22	96	70	44	17	90	62
35	102	76	51	25	99	73	46	20	92	65
36	105	79	54	28	802	76	48	22	95	68
37	07	82	56	31	05	79	52	25	98	70
38	10	85	59	34	08	82	55	28	1501	73
39	13	88	62	37	11	85	58	31	04	76
40	16	91	65	40	14	88	61	34	07	79
41	19	94	68	42	16	90	64	37	10	82
42	22	97	71	45	19	93	67	40	13	85
43	23	300	74	48	22	96	70	43	15	88
44	28	02	77	51	25	99	72	46	18	91
45	31	05	80	54	28	1002	75	48	21	93
46	34	08	83	57	31	05	78	51	24	96
47	37	11	85	60	34	08	81	54	27	99
48	40	14	88	63	37	10	84	57	30	1702
49	42	17	91	66	40	13	87	60	33	05
50	45	20	94	68	43	16	90	63	36	08
51	48	23	97	71	45	19	93	66	38	11
52	51	26	500	74	48	22	96	69	41	14
53	54	29	03	77	51	25	98	72	44	16
54	57	31	06	80	54	28	1201	74	47	19
55	60	34	09	82	57	31	04	77	50	22
56	63	37	12	86	60	34	07	80	53	25
57	66	40	15	89	63	37	10	83	56	28
58	69	43	17	92	66	39	13	86	59	31
59	72	46	20	95	69	42	16	89	61	34
60	75	49	23	97	71	45	19	92	64	37

A Table of Sines.

The Degrees of the Quadrant.

M.	10	11	12	13	14	15	16	17	18	19
1	1739	1911	2082	2252	2422	2591	2759	2926	3093	3258
2	42	14	85	55	25	94	62	29	96	61
3	45	17	88	58	28	97	65	32	98	64
4	47	19	90	61	30	99	67	35	3101	67
5	51	22	93	64	33	2602	70	38	04	69
6	53	25	96	67	36	05	73	40	07	72
7	56	28	99	69	39	08	76	43	09	75
8	59	31	2102	72	42	11	79	46	12	78
9	62	34	05	75	45	13	81	49	15	80
10	65	37	07	78	47	16	84	51	18	83
11	68	39	10	81	50	19	87	54	20	86
12	71	42	13	83	53	22	90	57	23	89
13	74	45	17	86	55	25	93	60	26	91
14	76	48	19	89	59	28	95	63	29	94
15	79	51	22	92	62	30	98	65	32	97
16	82	54	25	95	64	33	2801	68	34	3300
17	85	57	27	98	67	36	04	71	37	02
18	88	59	30	2300	70	39	07	74	40	05
19	90	62	33	03	73	41	09	76	43	08
20	93	65	36	06	76	44	12	79	46	11
21	96	68	39	09	78	47	15	82	48	13
22	99	71	42	12	81	50	18	85	51	16
23	1802	74	45	15	84	53	21	88	54	19
24	05	77	47	17	87	55	23	90	56	22
25	08	79	50	20	90	58	26	93	59	24
26	10	82	53	23	92	61	29	96	63	27
27	13	85	56	26	95	64	32	99	65	30
28	16	88	59	29	98	67	35	3002	68	33
29	19	91	61	32	2901	69	37	04	70	35
30	22	94	64	34	04	72	40	07	73	38

A Table of Sines.

The Degrees of the Quadrant.

M.	10	11	12	13	14	15	16	17	18	19
31	1824	1996	2167	2337	2507	2675	2843	3010	3176	3341
32	28	99	70	40	09	78	46	13	78	43
33	30	2002	73	43	12	81	48	15	81	46
34	33	05	76	46	15	83	51	18	84	49
35	36	08	78	49	18	86	54	21	87	52
36	39	11	81	51	21	89	57	24	89	54
37	42	14	84	54	24	92	60	26	92	57
38	46	16	87	57	26	95	62	29	95	60
39	48	19	90	60	29	98	65	32	98	62
40	50	22	93	63	32	2700	68	35	3201	65
41	53	25	96	65	34	03	71	37	03	68
42	56	28	98	68	38	06	74	40	06	71
43	59	31	2201	71	40	09	76	43	09	74
44	6	34	04	74	43	12	79	46	12	76
45	65	36	07	77	46	14	82	49	14	79
46	68	39	10	80	49	17	89	51	17	82
47	70	42	13	82	52	20	87	54	20	85
48	73	45	16	85	55	23	90	57	23	87
49	76	48	18	88	57	26	93	60	25	90
50	79	51	21	91	60	28	96	62	28	93
51	80	53	24	94	63	31	99	65	31	96
52	85	56	27	97	66	34	2901	68	34	98
53	82	59	30	99	68	37	04	71	36	3401
54	91	62	33	2402	71	40	07	73	39	04
55	94	65	35	05	74	42	10	76	42	06
56	96	68	38	08	77	45	13	79	45	09
57	99	70	41	11	80	48	15	82	47	12
58	1902	73	44	13	82	51	18	85	50	15
59	05	76	47	16	85	54	21	87	53	17
60	08	79	49	19	88	56	24	90	56	20

A Table of Sines.

The Degrees of the Quadrant.

M.	20	21	22	23	24	25	26	27	28	29
1	3523	3586	3749	3910	4070	4229	4386	4542	4697	4851
2	26	89	51	13	73	31	89	43	4700	53
3	28	92	54	15	75	34	91	48	03	56
4	31	94	57	18	78	37	94	50	05	58
5	34	97	59	21	81	39	96	53	07	61
6	37	3600	62	23	83	42	99	55	10	63
7	39	03	65	26	86	45	4402	58	13	66
8	42	05	68	29	89	47	04	61	15	68
9	45	08	70	31	91	50	07	63	18	71
10	47	11	73	34	94	52	10	66	20	76
11	50	13	76	37	96	55	12	68	23	73
12	53	16	78	39	99	58	15	71	25	78
13	56	19	81	42	4102	60	18	73	28	81
14	57	22	84	45	04	63	20	76	31	83
15	61	24	86	47	07	66	23	79	33	86
16	64	27	89	50	10	68	25	81	36	88
17	67	30	92	53	12	71	28	84	38	91
18	69	32	94	55	15	74	31	86	41	93
19	72	35	97	58	18	76	33	89	43	96
20	75	38	3800	61	20	79	36	92	46	98
21	77	41	03	63	23	81	38	94	48	4901
22	80	43	05	66	26	84	41	97	51	04
23	83	46	08	69	28	87	44	99	54	06
24	85	49	11	71	31	89	46	4602	56	09
25	88	51	13	74	34	92	49	05	59	11
26	91	54	16	77	36	95	52	07	61	14
27	93	57	19	79	39	97	54	10	64	16
28	97	60	21	82	42	4300	57	13	66	19
29	98	62	24	85	44	02	59	15	69	22
30	3502	65	27	87	47	05	62	18	72	24

A Table of Sines.

The Degrees of the Quadrant.

M.	20	21	22	23	24	25	26	27	28	29
31	3505	3668	3829	3990	4149	4308	4464	4620	4774	4927
32	07	70	32	93	52	10	67	23	77	29
33	10	73	35	95	55	13	70	25	79	32
34	13	76	37	98	57	16	72	28	82	34
35	16	79	40	4001	60	18	75	30	84	37
36	18	81	43	03	63	21	78	33	87	39
37	21	84	46	05	65	24	80	35	89	42
38	24	87	48	09	68	26	83	38	92	44
39	27	89	51	11	71	29	86	41	94	47
40	29	92	54	14	73	31	88	44	97	49
41	32	95	56	17	76	34	90	64	99	52
42	35	97	59	19	78	36	93	48	4802	54
43	37	3700	62	22	81	39	96	51	05	57
44	40	03	64	25	84	42	98	53	07	60
45	43	06	67	28	86	44	4501	56	10	62
46	46	08	70	30	89	47	03	59	12	65
47	48	11	72	33	92	50	06	61	15	67
48	51	14	77	35	94	52	09	64	17	70
49	54	16	78	38	97	55	11	66	20	72
50	56	19	80	41	4200	57	14	69	22	75
51	59	22	83	43	02	60	16	71	25	77
52	62	24	86	46	08	63	19	74	28	80
53	65	27	88	49	05	65	22	77	30	82
54	67	30	91	51	10	68	24	79	33	85
55	70	32	94	54	13	71	27	82	35	87
56	73	35	96	57	16	73	29	84	38	90
57	75	38	99	59	18	76	32	87	40	93
58	78	41	3902	62	21	78	35	89	45	95
59	81	43	05	65	24	81	37	92	43	97
60	84	46	08	67	26	84	40	95	48	7000

A Table of Sines.

The Degrees of the Quadrant.

M.	30	31	32	33	34	35	36	37
1	5002	5153	5302	5449	5594	5738	5880	6020
2	05	55	04	51	97	40	82	23
3	07	58	06	54	99	43	85	25
4	10	60	09	56	5601	45	87	27
5	12	63	11	58	04	48	90	30
6	15	65	14	61	06	50	92	32
7	17	68	16	63	09	52	94	34
8	20	70	19	66	11	55	96	37
9	22	73	21	68	14	57	99	39
10	25	75	24	71	16	59	5501	41
11	27	78	26	73	18	62	04	44
12	30	80	29	76	21	64	06	46
13	32	83	31	78	23	67	09	48
14	35	85	34	80	25	69	11	51
15	38	88	36	83	28	71	13	53
16	40	90	39	85	30	74	15	55
17	42	93	41	88	33	76	18	57
18	45	95	43	90	35	78	20	60
19	48	98	46	93	38	81	22	62
20	50	5200	48	95	40	83	25	64
21	53	02	51	97	42	85	27	67
22	55	05	53	5500	45	88	29	69
23	58	08	56	01	47	90	32	71
24	60	10	58	05	50	93	34	74
25	63	12	61	07	52	95	36	76
26	65	15	63	09	54	97	39	78
27	68	17	66	12	57	5800	41	81
28	70	20	68	14	59	02	43	83
29	73	22	70	17	6201	05	46	85
30	75	25	73	19	64	07	48	88

A Table of Sines.

The Degrees of the Quadrant.

M.	30	31	32	33	34	35	36	37
31	5078	5227	5375	5522	5666	5809	5950	6090
32	80	30	78	24	69	12	53	92
33	83	32	80	27	71	14	55	94
34	85	35	83	29	74	16	57	97
35	88	37	85	31	76	19	60	99
36	90	40	88	34	78	21	62	6101
37	93	42	90	36	81	23	64	04
38	95	45	93	39	83	26	67	06
39	98	47	95	41	85	28	69	08
40	5100	50	97	43	88	31	71	11
41	03	52	5400	46	90	33	74	13
42	05	55	02	48	93	35	76	15
43	08	57	04	51	95	38	78	17
44	10	60	07	53	97	40	81	20
45	13	62	10	56	5700	42	83	22
46	15	65	12	58	02	45	85	24
47	18	67	15	60	05	47	88	27
48	20	69	17	63	07	49	90	29
49	22	72	19	65	09	52	92	31
50	25	74	22	68	12	54	95	34
51	27	77	24	70	14	56	97	36
52	30	79	27	73	17	59	99	38
53	33	82	29	75	19	61	6002	40
54	35	84	32	77	21	64	04	43
55	38	87	34	80	24	66	06	45
56	40	89	37	82	26	68	09	47
57	43	92	39	85	29	71	11	49
58	45	94	41	87	31	73	13	52
59	48	97	44	89	33	75	16	54
60	50	99	46	92	36	78	18	56

A Table of Sines.

The Degrees of the Quadrant.

M.	38	39	40	41	42	43	44	45
1	6159	6295	6430	6563	6694	6822	6949	7073
2	61	98	32	65	96	24	51	75
3	63	6300	34	67	98	26	53	77
4	66	02	37	69	7700	28	55	79
5	68	04	39	71	02	31	57	81
6	70	07	41	74	04	33	59	83
7	73	09	43	76	06	35	61	85
8	75	11	46	78	08	37	63	87
9	77	13	48	80	11	39	65	89
10	79	16	50	83	13	40	67	9
11	82	18	52	85	15	43	69	94
12	84	20	54	87	17	45	72	96
13	86	22	57	89	19	48	74	98
14	89	25	59	91	21	50	76	7100
15	91	27	61	93	24	52	78	02
16	93	29	63	96	26	54	80	04
17	95	31	66	98	28	56	82	06
18	98	34	68	6600	30	58	84	08
19	6200	36	78	02	32	60	86	10
20	02	38	72	04	34	62	88	12
21	05	40	74	06	36	64	90	14
22	07	43	77	08	38	67	92	16
23	09	45	79	11	41	69	94	18
24	11	47	81	13	43	71	97	20
25	13	49	83	15	45	74	99	22
26	16	52	86	17	47	75	7001	24
27	18	54	88	19	49	77	03	26
28	20	56	90	22	52	79	05	28
29	23	58	92	24	54	81	07	30
30	25	61	94	26	56	83	09	32

A Table of Sines.

The Degrees of the Quadrant.

M.	38	39	40	41	42	43	44	45
31	6227	6363	6497	6528	6758	6886	7011	7134
32	30	65	99	30	60	88	13	36
33	32	67	6501	33	62	90	15	39
34	34	70	03	35	64	92	17	41
35	36	72	05	37	66	94	19	43
36	39	74	08	39	69	96	21	45
37	41	76	10	41	71	98	23	47
38	43	79	12	44	73	6900	26	49
39	45	81	14	46	75	02	28	51
40	48	83	16	48	77	05	30	53
41	50	85	19	50	79	07	32	55
42	52	87	21	52	81	09	34	57
43	55	90	23	54	83	11	36	59
44	57	92	25	57	86	13	38	61
45	59	94	27	59	88	15	40	63
46	61	96	30	61	90	17	42	65
47	64	99	32	63	92	19	44	67
48	66	6401	34	65	94	21	46	69
49	68	03	36	67	96	23	48	71
50	70	05	39	70	99	25	50	73
51	73	08	41	72	6801	28	52	75
52	75	10	43	74	03	30	54	77
53	77	12	45	76	05	32	57	79
54	79	14	47	78	07	34	59	81
55	82	17	50	80	09	36	61	83
56	84	19	52	83	11	38	63	85
57	86	21	54	85	13	40	65	87
58	89	23	56	87	16	42	67	89
59	91	26	58	89	18	44	69	91
60	93	28	60	91	20	46	71	93

A Table of Sines.

The Degrees of the Quadrant.

M.	46	47	48	49	50	51	52	53
1	7195	7315	7433	7549	7662	7773	7882	7988
2	97	17	35	51	64	75	84	90
3	96	19	37	53	66	77	85	92
4	7201	21	39	55	68	79	87	93
5	03	23	41	57	70	81	89	95
6	05	25	43	59	72	82	91	97
7	07	27	45	60	73	84	93	98
8	09	29	47	62	75	86	94	8000
9	11	31	49	64	77	88	96	02
10	13	33	51	66	79	90	9	04
11	15	35	53	68	81	91	7990	05
12	18	37	55	70	83	93	01	07
13	20	39	57	72	85	95	03	09
14	22	41	59	74	87	97	05	11
15	24	43	61	76	88	99	97	12
16	26	45	63	77	90	7801	09	14
17	28	47	64	79	92	03	16	16
18	30	49	66	81	94	04	12	18
19	32	51	68	83	96	06	14	19
20	34	53	70	85	98	08	16	21
21	36	55	72	87	7700	10	18	23
22	38	57	74	89	01	11	19	25
23	40	59	76	91	03	13	21	26
24	42	61	78	93	05	15	23	28
25	44	63	80	95	07	17	25	30
26	46	65	82	96	09	19	26	32
27	48	67	84	98	11	21	28	33
28	50	69	86	7600	12	22	30	35
29	52	71	88	02	14	24	32	37
30	54	73	90	04	16	26	33	38

A Table of Sines.

The Degrees of the Quadrant.

M.	46	47	48	49	50	51	52	53
31	7256	7375	7491	7606	7718	7828	7935	8040
32	58	77	93	08	20	31	37	42
33	60	79	95	10	22	32	39	44
34	62	81	97	12	24	33	41	45
35	64	82	99	14	25	35	42	47
36	66	84	7501	15	27	37	44	49
37	68	86	03	17	19	39	46	51
38	70	88	05	19	31	40	48	52
39	72	90	07	21	33	42	49	54
40	74	92	09	23	35	44	51	56
41	76	94	11	25	37	46	53	58
42	78	96	13	27	39	48	55	59
43	80	98	14	29	40	49	56	61
44	82	7400	16	30	42	51	58	63
45	84	02	18	32	44	53	60	64
46	86	04	20	34	45	55	62	66
47	88	06	22	36	48	57	63	68
48	90	08	24	38	50	58	65	70
49	92	10	26	40	51	60	67	71
50	94	12	28	42	53	62	69	73
51	96	14	30	44	55	64	70	75
52	98	16	32	45	57	66	72	76
53	7300	18	34	47	59	67	74	78
54	01	20	36	49	60	69	76	80
55	03	22	37	51	62	71	77	82
56	05	24	39	53	64	73	79	83
57	07	26	41	55	66	75	81	85
58	09	28	43	57	68	76	83	87
59	11	29	45	58	70	78	85	88
60	13	31	47	60	71	80	96	90

A Table of Sines.

The Degrees of the Quadrant.

M.	54	55	56	57	58	59	60
1	8092	8193	8292	8388	8482	8573	8662
2	94	95	94	90	83	75	63
3	95	97	95	91	85	76	65
4	97	98	97	93	87	78	66
5	99	8200	98	95	89	79	68
6	8100	01	8300	96	90	81	69
7	02	03	02	98	91	82	70
8	04	05	03	99	93	84	72
9	05	06	05	8401	94	85	73
10	07	08	07	02	96	87	75
11	09	10	08	04	97	88	76
12	11	12	10	06	99	90	78
13	12	13	11	07	8500	91	79
14	14	15	13	09	02	93	81
15	16	16	15	10	03	94	82
16	17	18	16	12	04	96	84
17	19	20	18	14	06	97	85
18	21	21	19	15	07	99	87
19	22	23	21	17	09	8600	88
20	24	25	23	18	11	02	90
21	26	26	24	20	13	03	91
22	28	28	26	21	14	05	92
23	29	30	28	23	16	06	94
24	31	31	29	24	17	07	95
25	33	33	31	26	19	08	97
26	34	35	32	28	20	10	98
27	36	36	34	29	22	12	99
28	38	38	36	31	23	13	8701
29	39	40	37	32	25	15	02
30	41	41	39	34	26	16	04

A Table of Sines.

The Degrees of the Quadrant.

M.	54	55	56	57	58	59	60
31	8143	8243	8340	8435	8528	8618	8705
32	44	45	42	37	29	19	06
33	46	46	44	38	31	21	08
34	48	48	46	40	32	22	09
35	49	49	47	42	35	23	11
36	51	51	48	43	34	25	12
37	53	53	50	45	37	28	13
38	55	54	52	46	39	29	15
39	56	256	53	48	40	30	16
40	58	57	55	49	42	31	18
41	60	59	56	51	43	33	19
42	61	61	58	52	45	34	20
43	63	63	60	54	46	36	22
44	65	64	61	55	48	37	24
45	66	66	63	57	49	38	25
46	68	67	64	58	51	40	26
47	70	69	66	60	52	41	28
48	71	71	67	62	54	43	29
49	72	72	69	63	55	44	31
50	74	74	71	65	57	46	32
51	76	76	72	66	58	47	33
52	78	77	74	68	60	48	35
53	80	79	75	70	61	50	36
54	81	81	77	71	63	51	38
55	83	82	79	73	64	53	39
56	85	84	80	74	66	55	40
57	86	85	82	76	67	56	42
58	88	87	83	78	68	57	43
59	90	89	85	79	70	59	45
60	91	90	87	80	72	60	46

A Table of Sines.

The Degrees of the Quadrant.

M.	61	62	63	64	65	66	67
2	8749	8832	8913	8990	9065	9138	9207
4	52	35	15	93	68	40	09
6	55	38	18	95	70	42	11
8	58	41	21	98	73	45	14
10	60	43	23	9000	75	47	16
12	63	46	26	03	78	49	18
14	66	49	28	06	80	52	21
16	69	52	31	08	83	54	23
18	71	54	34	11	85	56	25
20	74	57	36	13	87	59	28
22	77	60	39	16	90	61	30
24	80	62	41	18	92	64	32
26	83	65	44	21	95	66	34
28	85	67	47	23	98	68	36
30	88	70	49	26	9100	71	39
32	91	73	52	28	02	73	41
34	94	75	54	31	04	75	43
36	96	78	57	33	07	77	45
38	99	80	60	36	09	80	47
40	8802	83	62	38	12	82	50
42	05	86	65	41	14	84	52
44	08	89	67	43	16	87	54
46	10	91	70	46	19	89	56
48	13	94	72	48	21	91	59
50	16	97	75	51	23	94	62
52	19	99	78	54	26	96	63
54	21	8902	80	56	28	88	65
56	24	05	83	58	31	9100	67
58	27	07	85	61	33	03	70
60	29	10	88	63	35	05	70

A Table of Sines.

The Degrees of the Quadrant.

M.	68	69	70	71	72	73	74
2	9274	9338	9399	9457	9512	9565	9614
4	76	40	9401	59	14	66	16
6	78	42	03	61	16	68	17
8	80	44	05	63	18	70	19
10	83	46	07	65	19	71	20
12	85	48	09	66	21	73	22
14	87	51	11	68	23	75	24
16	89	52	13	70	25	76	25
18	91	54	15	72	27	78	27
20	93	56	17	74	28	80	28
22	96	58	19	76	30	81	30
24	98	60	20	78	32	83	32
29	9300	63	22	80	34	85	33
28	02	65	24	81	35	86	35
30	04	67	26	83	37	87	36
32	06	69	28	85	39	90	38
34	08	71	30	87	40	91	39
36	10	73	32	89	42	93	41
38	13	75	34	91	44	95	42
40	15	77	36	92	46	96	44
42	17	70	38	94	48	98	45
44	19	81	40	98	49	9600	47
46	21	83	42	99	51	01	48
48	23	85	44	9500	53	03	50
50	25	87	46	01	54	04	51
52	27	89	47	03	56	06	53
54	29	91	49	05	58	08	55
56	32	93	51	07	59	09	56
58	34	95	53	09	61	11	58
60	36	97	55	10	63	13	59

A Table of Sines.

The Degrees of the Quadrant.

M.	75	76	77	78	79.	80	81	82
5	9563	9706	9747	9784	9819	9850	9879	9905
10	67	10	50	87	22	53	81	07
15	70	13	53	90	24	55	84	09
20	74	17	56	93	27	58	86	11
25	78	20	60	96	30	60	88	12
30	81	24	63	99	32	63	90	14
35	85	27	66	9802	35	65	92	16
40	89	30	69	05	38	68	94	18
45	92	34	72	08	40	70	96	20
50	96	37	75	11	43	72	98	22
55	99	40	78	13	46	74	9900	24
60	9703	44	81	16	48	77	03	25

The Degrees of the Quadrant.

M.	83	84	85	86	87	88	89	
5	9927	9947	9963	9977	9987	9994	9998	
10	29	48	64	78	88	95	98	
15	31	50	65	78	88	95	99	
20	32	51	67	79	89	96	99	
25	34	52	68	80	90	95	99	
30	36	54	69	81	90	96	99	
35	37	55	70	82	91	97	99	
40	39	57	71	83	92	97	99	
45	40	58	72	84	92	98	99	
50	42	59	73	84	93	98	99	
55	44	60	75	85	93	98	99	
60	45	62	76	85	94	98	10000	
							10000	

The

The Extraction of Roots.

IT is not unnecessary before we do enter into this order and method of teaching how to extract a Root to shew the divers kinds and their definitions: Therefore you must know that of Roots there are sundry sorts, according to the quantities from which they are derived as the Square Cubes, Squared squares, Surdolides, &c. for the numbers receive their names from the only quantities, every quantity having his Root, which may be called the first quantity. Because it is the side or beginning of the quantity whereunto it is set: Numbers of the second quantity are called Squares or the third Cubes, of the fourth squared squares as before: wherein you may proceed infinitely if you will but you shall seldome or never have use for the extraction of the Root of any quantity more than Squares and Cubes: A Square number is the Product of any number multiplyed in it selfe and Root thereof is the multiplyer whereby the same square number is produced: As for example, 4 is a square number comming of the multiplication of 2 in it self which is the Root thereof.

A Cubick number is the Product of any number multiplyed into it self and the same Product multiplyed again by the first number: As 2 multiplyed by it selfe is 4 that Product multiplyed again by 2, the first number makes 8 which is a Cubick number, and the Root thereof.

A Squared square number is produced of 3 multiplications, first any number by it selfe makes a square number, that Product again by the first Root or multiplyer makes a Cubick number: and lastly that Product again by the first figure or Root, produceth a squared square number, as 2 multiplyed in it selfe makes 4, a square number, that againe by 2 makes 8, which is a Cubick number and then that Product again by 2, produceth 16 which is a Squared square number: and the Root thereof is 2. A Surdolide number is the Product of a number multiplyed 4 times by the Root thereof, as 32 is a Surdolide number, the number whereof is 2: for 2 multiplyed in it selfe is 4, that multiplyed again by 2 is 8, the same Product againe by 2 makes 16: and lastly the same Product multiplyed by the first number 2, makes 32. Where-

fore I conclude, that 32 is a Surdſolide number, and the number 2, whereby the ſaid number is produced, is the Surdſolide Root to the ſaid number: And thus multiplying the laſt Product by the firſt Number or Root, you may proceed infinitely, but more then theſe are needleſſe, and as I ſaid before, without any great or common uſe.

Now for the finding of the Root, it muſt be done according to the quantity whereof it taketh Denomination, as whether it be of a Square or Cube, or otherwiſe: which knowne, let us proceed to the working thereof.

You muſt underſtand, that the order of extracting the Root of any quantity, is not much unlike to Diviſion, differing onely in this, that whereas in Diviſion the Diviſor is known, but here it is to find: alſo in Diviſion you alwayes kæp one Diviſor, but in this, you muſt change your Diviſor at each removing, which is at the finding of every figure contained in the Root: Now therefore I will lay downe one generall way for the Extraction of the moſt of all quantities whatſoever, which is done by certain numbers applyed to each ſeverall quantity, which are theſe: For the ſquare root in one number required, which is 20. For the Cube two numbers, which are 300, and 30. For the ſquared ſquare three numbers, viz. 4000, 600, and 40.

Thus having declared the kinds, numbers, quantities and order of the Extraction of all ſorts of Roots, it followeth that we proceed to the practice thereof: And firſt to extract the ſquare root of any number, you muſt conſider as before I have ſaid, that 20 is the number for the ſame quantity: Alſo you muſt learne by memory the juſt ſquare of all the 9 Unities, which if you know not, this Table will ſtand in ſome ſtead: where you ſee that againſt every of the 9 Unities aforeſaid, towards the right hand is the ſquare of y unity, againſt which it doth ſtand: which known, ſet down the number whereof you would extract the ſquare root, then under the laſt figure at the right hand, put a prick, & then proceeding towards the left hand under every ſecond figure put a prick, that done draw with your pen a Quotient as in Diviſion: Now for to find the Root of your given number, take the greateſt

1	1
2	4
3	9
4	16
5	25
6	36
7	49
8	64
9	81

ſquare

Square number contained in the number over the first prick, that squarq number take from the number over the said first prick and set the Remainer over it, the root of which Square number put in the quotient for the figure of the Root: that Root multiply by 20 the number for the Square root: and then loke how often the Product thereof may be taken for the number over, or to the left hand of the second prick, which put in your quotient for the second figure of the root: but this is to be noted for a generall rule that you must take no greater number for your second figure, then that the square thereof added with the former Product, may be taken from the number over the said second prick: and also loke how many pricks are under your given number, so many Figures must be in the quotient, for the root of the said number: then having found 2 figures, in the quotient, if there be any more pricks, multiply the whole number in the quotient by 20, and seeke how often the Product thereof may be taken from the number over or belonging to the next prick, which number, put in the quotient, and adding the square thereof to the former Product, subtract the whole summe from the number over the said prick, and cancelling the said number as at each remove you must doe, set the remainer over it, and if there be any more pricks undone, doe as you did before, alwayes multiplying the quotient by 20, thereto adding the square of the last figure, and the totall summe being subtracted from the last Remainer, if there rest nothing, it is a Square number or else not; which you may prove if you multiply the root by it selfe squarely, for the root being truly extracted will Produce the first given number. But because the Examples are easiest for the understanding, let 104976, bee the given number whereof I would know the square root, viz. what number being multiplyed in it selfe, will procure the foresaid number of 104976. Therefore first I set down the said number and under the last figure towards the right hand, which in this example is 6. I put a prick or point, another under the 9, and lastly another under 0, leaving one figure betwixt every prick; which done and the quotient drawn, the given number will stand thus: 104976|___ whereby I see that the root of the said number must consist of 3 figures, because it hath 3 pricks under it: then I seek

the greatest square number is 10, it being the number belonging to the first prick toward the left hand, that I find to be 9, which is produced of 3 multiplyed squarely, therefore I put 3 in the quotient for the first figure of the Roote and the square thereof being 9, I subtract from 10 the number over the first prick, and there rests 1. The order of which work will stand thus: where you see that the figures over the first prick is cancelled there is 3 in the Quotient for the first figure of the root and 1 rests, which with the figures betwixt it and the next prick, makes 149 for the number of the second prick. Now for the second figure of the roote, I multiply 3 the root already found by 20, and the Product is 60, that I seek how often I may take from 149 the number over the second prick which I may do 2 times, for two times 60 is 120, whereunto the square of 2 which is 4, being added, makes 124. that subtracted from 149 leaves 25; therefore I put 2 in the quotient for the second figures of the Root, and cancelling the figures over the second prick, the remainer being put over it, the working thereof will stand in this order: where you see the Quotient is 32, for the two first figure of the Root, and the figures of the two first prickes being cancelled, there rests 20, which with the other figures betwixt them, and the third and last pricke, makes 2576, for the number over the last prick: now therefore to finde the last figure of the Root, I multiply the Root already found, that is to say 32, 20. and the Product thereof is 640, that I seeke how often it may bee taken out of 2576, the number over the last prick, which may be done 4 times, for 4 times 640, is 2560, whereunto if I adde the square of 4, there will amount 2576: which because it may be taken from the number remaining over the last prick, I put 4 in the Quotient for the last figure of the Root, and subtracting the former Product of 2576, from the number over the last prick, which is likewise

```
      1
  204976 | 3
  9
```

```
  125
  104976 | 32
  9
  124        20
             3
            ----
            60
             2
            ----
           120
             4
           ----
           124
  125
  104978 | 324
  9
  124
  2576.
        32
        20
        ----
```

2576, there

2576, there will reſt nothing, therefore I cancell those Figures likewiſe, and thereby conclude 104976, to be a ſquare number, and 324 to bee the rot thereof: the proofe whereof is by multiplying the rote into it ſelfe ſquarely: for if you multiply 324 by 324, the firſt given number of 104976 will be produced the working whereof will be as above you may ſee.

This Example in my mind might bee ſufficient with often uſe and practiſe, to bring perfection in this kinde of Extractions, becauſe that although the ſumme bee never ſo great, it is done all by one maner of worke: yet nevertheleſſe, if I did not thinke that thou wouldeſt complaine rather of tedioulneſſe of learning, then of the difficulty of teaching, I would give another Example: for the variety of Examples makes the worke ſeeme the more eaſie. Therefore once againe: let 54873625 bee a given number, whereof I would know the Square Root, firſt I put pricks or points under the given number in ſuch order as you ſee, beginning at the laſt figure towards the right hand, and proceeding towards the left leaving one figure unpointed betwixt every prick, where you ſee that the whole given number conſiſts of 5 pricks, therefore of ſo many figures muſt your Root or quotient be: then drawing a quotient I ſeeke the greateſt Square number 5, which is the number over the firſt prick which greateſt Square number I find to be 4, and the Rot thereof 2, for two times 2 is foure, therefore I put two in the quotient, and taking 4 the Square thereof from 5 the number over the firſt prick, there will reſt 1 which I ſet over 5 cancelling the ſaid 5, the worke whereof will ſtand as a-

gainſt: then for the ſecond figure of the rot, I multiply 2, the firſt figure of the Rot already found by 20, and the Product is 40, that I ſeeke how often may bee taken from 148, the number remaining over the ſecond pricke, which may bee done 3 times, for three times 40 is 120, whereunto the ſquare of 4 being added

	630
	4
	2560
	16
	2576
	324
	324
	1296
	648
	972
	104976

54873625 | 2

4

added makes 129, then I put 3 in the quotient for the second figure of the root and subtracting 129 the last Product from 148, the number remaining over the second prick, there will rest 19, which with the other figures betwixt them, and the next prick, makes 1973, therefore I cancell the 148, and setting the remainer over it I have 1973, for the number over the third prick and 23 in the quotient for the first two figures of the root: now for the third figure of the root, I multiply 23 the root already found by 20, the Product is 460, which may bee taken from 1973, the number remaining over the third prick 4 times, for 460, multiplyed by 4 makes 1840, whereunto adding 16, the square of 4, the Product is 1856, therefore I put 4 in the quotient for the 3. figure of the root, and subtracting 1856 from 1973, the number over the third prick there will remaine 117, which with the other figures betwixt them and the next prick, makes 11706, for the number over the fourth prick, and there is in the quotient 234 for the root already found, the whole worke standing as above: Again, for to find the fourth figure of the root, I multiply 234 the root found, by 20, the Product whereof is 4680, which may be taken out of 11706 two times, for 4680 multiplyed by 2 makes 9360, which with 4 the square of 2, makes in all 9364. the same being subtracted from 11706, the number remaining over the fourth prick, there will rest 2342, which with the other Figure betwixt them and the fifth or last prick, makes 234225 for the number remaining over the last prick; therefore making my subtraction, I set the remainer over it, and put 2 in the quotient for the fourth figure of the root, as you may see in the Margine: then to find the last figure of the root of this given number aforesaid, I multiply the whole Root already found, viz. 2342 by 20, the Product is 46840 which may bee taken from

```
 119
548730625 | 23
4
119
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   1
 17917
548730625 | 234
4
129
  1856
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   123
 1791743
548730625 | 2342
4
129
  1856.
   9364
```

234225, the

234225, the number over the laſt prick 5 times, for 46840 multiplyed by 5 makes 234200, whereunto if I adde 25, the ſquare of 5, the whole Product will be 234225, which number is equall to the number over the laſt prick, therefore I put 5 in the quotient, for the laſt figure of the root, and ſubtracting the whole ſum of the laſt Product, viz. 234225, from the number over the laſt point or prick, which is likewiſe 234225, there will remaine nothing, whereby I find 548730625 the given number, to bee a Square number, and the root thereof to be 23425, which is the number found out in the Quotient, as in the working thereof you may more plainely perceive.

For proof whereof if you multiply 23425, the root ſquarely into it ſelf, the Product thereof will be equall to the firſt given number.

I doubt not but to any indifferent conceit, theſe two examples will ſuffice, as well as if I ſhould contrive a whole volume therof when it is ſo that a given number is a right Square number, but if the given number be not a Square number, it is unpoſſible for to find an exact Root thereto, but that after the worke there will remaine ſomething as a fraction or part of a number more to be added to the *Quotient*: for the true and perfect valuation of which fraction or remainer, none as yet could attaine, but they have ſet down ſo nere a way for the extraction of the root of any number not being a Square number, that thereby no great error may be perceived: For the knowledge and better underſtanding of which, let this be a familiar Example: you know that 16 is a right Square number, and the Square root thereof is 4, but if you would extract the Square root of 18, you ſhould have 4 in your Quotient likewiſe for the root thereof, but then there will reſt 2, whereby you ſee that 18 is no Square number, neither can you know what fraction to make of it, by reaſon that you have no certaine Deviſor which might ſtand for Denominator to the Numerator or remainer: onely let this ſuffice, that to find the neareſt root thereof, the Rule is thus: double the Remainer for the Numerator and Quadruple; viz. multiply the root by 4, and thereto adde 1, for the Denominator to the ſaid Numerator, as in this example, to extract the neareſt Square root of 18, I find 4 to bee

18	4 17
16	

in the quotient and 2 remaining, which 2 being doubled makes 4 for the Numerator, and 4 the root being multiplyed by 4, makes 16 and 1 added therewith makes 17 for the Denominator, whereby I say, that $4\frac{2}{17}$, is the nearest Square root of 18, which may be found out: for if you reduce $\frac{2}{17}$ into one common Denomination, and then multiply them squarely, the Product will be $17\frac{11}{17}$ which is but $\frac{1}{17}$ too little.

Thus having declared the order how to extract the Square root of any number: It resteth now that I shew the number of extracting the Cube root of any number: as for the principall uses thereof, you shall find in the general practise of the Mathematicks.

To find out the Cube root of any given number, being a right Cube number, first put downe the given number, and as in the Square number you put points or pricks: beginning at the right hand and so towards the left, leaving betwixt each point one figure void, so in the extraction of the root of a Cube number, you must leave two figures void or unpricked betwixt every point, and as in the Square root, so likewise in this: look how many points are under the given number, so many figures must bee contained in the root thereof, which is also to be observed in extracting the root of any quantity whatsoever: these things being considered, it is also necessary, that you know the greatest Cubick number of every of the 9 unities, whereof tee Table hereunder specified maketh explanation: where you see that against each unitie standeth the Cube number thereof: which being known, and the given number pricked, with a quotient drawn as before I have shewed; to extract the Cube root, you have 2 numbers, viz. 300 and 30, but because the working thereof would be too long to expresse in termes, let 13824 be a given number, whereof I would extract the Cube root.

1....	1
2....	8
3....	27
4....	64
5....	125
6....	216
7....	343
8....	512
9....	729

First, I put down that number aforesaid with points under it and a quotient in this order, 13824, whereby I see that the root thereof must consist of two Figures, because so many points doe belong unto the given number: for the first figure whereof, I seeke the

the greatest Cube number contained in 13. the number over the first point towards the left hand, which I find to be 8. the Cube root thereof, which is 2. I put in the quotient for the first figure of the root, and subtracting 8 from 13. rests 5, which I put over 13. cancelling the said 13. which done the worke will be as below.

Now for to find the second figure of the Root, I set down the 2 numbers which serveth for the extraction of the Cube root, viz. 300, 30: and against 30. I put the Root already found which is 2, and against 300 the square thereof which is 4. these two figures I set towards the left hand of them, then I multiply 300 by 4, the figure which standeth against it, and the Product is 1200, that I seeke how often I may take from 5824, the number over the second prick, which I may doe foure times, therefore I put 4 in the quotient for the second figure, and upon the right hand against 300, I set 4 the last found number in the quotient, and against 30 I put 16, the Square thereof: and underneath I put 64, which is the Cube of 4, then multiplying all the Figures which are in a row into one Product. viz. 4 by 300, makes 1200, and that againe by 4 makes 4800 for that Product: then for the next 2 by 30, makes 60. and that by 16 makes 960 for the second Product, which I set downe together each under other. Lastly, because 64 hath no other number to be multiplyed therewith, I put that down under them, which done, I adde them altogether, and the totall summe is 5824, the same subtraded from the number over the last prick, leaveth nothing. whereby I see that 13824 is a Cubick number, and the Cube root therefore is 24, as you may more plainly see by the working thereof, which is put in the margine above, where you see that

5	13824	2
8		
4	300	4
2	30	16
	64	
30		300
2		4
		1200
60		4
16		4800
360		
60		
960		4800
		960
		64
		5824

24. being

24 being multiplyed into it selfe, and that Product againe by 24, the first multiplyer, the Product is 13824, which is equall to the first given number.

Againe, seeing that Examples are the easiest method of teaching and plainest for understanding: Let 12551868224, be a given Number: whereof I would extract the Cube root: First, having prickt it and drawne a Quotient for the Root, thus 12551868224. I see that the Root must consist of 4 Figures, so many pricks being under the given number. For the finding of which Figures, I seek first the greatest Cube number in 14, which is 8, the Root whereof being 2, I put in the Quotient, for the first figure of the Root subtracting 8, the Cube thereof, from 12 the number over the first prick, rests 4, then for the second figure of the Root I put downe 300, and the numbers of the Cube root, against 30. I set 2, the Root found: and against 300, 4, the square thereof: and multiplying 300 by 4, the Product is 1200, that may be taken out of 4551, the number over the second prick 3 times; therefore I put 3 in the Quotient, and likewise after 300, and the Square thereof which is 9, after 30, and the Cube thereof which is 27, I put under 30, then I multiply all the numbers in the first row, each by the other, viz. 4 by 300, makes 1200, and the same Product againe by 3 makes 3600, which I set by it selfe: then againe I multiply 2 by 30 is 60, and that againe by 9, makes 540, which I put under the other Product; Lastly, because 27 hath no number wherewith to be multiplyed, I set down likewise under both the other and the three numbers being set in order one under another as you see, I adde them altogether, and the whole Product is 4167. the same I subtract from 4551, the number over the next prick 4167, and there will remaine 384 to joyne with the number over the

	5824	24
		24
		96
		48
		576
		576
		24
		2304
		1152
		13824

	4		
12551868224			23
8			
4	300		3
2	30		9
	27		

260
540
27

the third prick : which done the work will stand in this order as you sée.

Now for the third Figure of the Root. I put downe 300 and 30 as before, and against 30 at the left hand, I put 23, the Root already found, and against 300 the Square thereof, which is 529, then multiplying 529 by 300, the Product is 158700, which may be twice taken from 384868, therefore I put 2 in the Quotient for the third Figure of the Root, and likewise put two to the right hand of 300, and the Square thereof which is 4, at the right hand of 30, and the Cube thereof being 8, I put under 30, which numbers will stand as above; then multiplying all the numbers in one row each by other into one Product, viz. 529 by 300, makes 158700 and that againe by 2, is 317400, for the whole Product of that row, which I set down by it selfe; then I multiply 23 by 30, is 690, and that againe by 4, is 2760 for the Product of the second row.

```
   4284
12551868224 | 23
8
4167
      529      300
       23       30
```

Lastly, because 8 hath no number with it, I put it downe under the other, and then adding all the thrée Summes together the Product is 320168, the same taken from 384868, the number over the third prick, rests for the number over the last prick, 64700224 and in the Quotient, is 232, the whole work being as you sée above.

```
                320168
6
438700
12551868224 | 232
8
   4167
          320168.
```

Now to find the fourth and last figure of the Root, I put down the two numbers againe which serve for the Cube root, viz. 300 and 30. At the left hand of 30 I put 232, the numbers in the Quotient, and at the left hand of 300, I set this Square of 232, which is 53824 in this order: Then multiplying 53824 by the Product 53824, is 16147200; which I séeke how often may be had 232 in 64700224, the numbers remaining over the last pricke, that may be done 4 times: Therefore I put 4 in the Quotient, for the fourth and last figure of the Root, and also I set the said 4 at the

right hand of 300, and the ſquare thereof which is 16 at the right hand of 30, and the Cube thereof being 64, I put right underneath 30, which done all the numbers will ſtand as above: Then multiplying all the numbers in each row into their ſeverall Products viz. 53824 by 300 makes 16147200; that againe by 4, is 64588800, which I ſet by it ſelfe: Then againe 232 by 30, is 6960, the ſame Product by 16, makes 111360, which I put downe under the other.

53824 300 4
232 30 16
64

Laſtly becauſe 64 hath no other number to be multiplyed therwith, I put it downe likewiſe under the other two numbers, and adding the three Products together the whole ſumme thereof will be 64700224, which being ſubtracted from the number remaining over the laſt prick, leaves nothing: So have I in the Quotient 2324, for the Cube root of 12551868224 the given number: the whole worke whereof is here ſet down in the margine. For the proofe whereof, if you multiply the Root viz. 2324 Cubickly in it ſelfe, the Product thereof will be equall with the firſt given number, as for Example you may ſee in the working.

Where you ſee that 2324 the Root being multiplyed into it ſelfe Squarely and then likewiſe the whole Product thereof again by the ſame Root 2324. The totall ſumme amounting thereof 12551868224, is the firſt given number.

But when you have a number given to extract the Cube root, and the foreſaid given number be not a right Cube number, whereby you cannot come to any perfect Root therof but that there will remaine ſome fraction or broken number after your ſaid Extraction, onely the manner to extract the neereſt root of a number not Cubicall: as moſt Writers do affirme, is thus:

12551868224

The difference betwixt the Cubick number of the Root and the Cubick number of a number more then the Root by an unity ſhall be the Denominator to the remainer, 1. added alſo thereto.

As for Example.

Let 12 be a number given, which not being a right Cube number, I would find the neereſt root thereof: Firſt the greateſt Cubick number in 12 is 8, the Cube root whereof being 2. I put in

the

the Quotient, and subtracting 8 the Cube thereof from 12, there will rest 4, which 4 being over, sheweth the 12 is no Cubick number; therefore adding 1 to 4, makes 5, which I put for the Numerator: and to find the Denominator thereto I set down the Cube 2 the root found, which is 8, and likewise 27 the Cube of 3, which is a number more than the root by 1, then subtracting the one from the other, viz. 8 from 27 leaves 19 for the Denominator, by which reason the néerest Cubick root of 12 is $\frac{5}{19}$, which being reduced and multiplyed Cubickly, makes $11\frac{4}{5}\frac{0}{1}\frac{1}{1}\frac{1}{3}$ the same abreviated makes 11 and very néere $\frac{5}{9}$ and it should be 12; therefore the error is $\frac{1}{8}$ too little, which although in this is no great error, yet in a great sum the errour would be very much: Therefore for those which desire a more exact and perfect extraction of the Square or cube root from numbers not being right square or cubick numbers: Mr. Record in his Whetstone of wit, setteth down an exact way (but being tedious) which is thus: For the Square root adde to the given number so many times two Ciphers as you desire the néernesse of the Root: And for the Cubick root so many times 3 Ciphers, as you desire the exactnesse of the Root thereof: and under the said Ciphers put pricks in such order as before is taught: and then mark how many pricks there is over and besides the pricks of the given number: and then extract the root from all those Ciphers, in such order as you did before: for if there be 1 more, the root shall be tenths, & the remainer parts of $\frac{1}{10}$, if there be 2 points or pricks over, more then the given number, then the root shall be hundreths, and the remainer parts of $\frac{1}{100}$, if 3 pricks be over, the Root shall be thousands, & the remainer parts of $\frac{1}{1000}$: and so you may come to a very néer Root, but not to any exact or perfect root, unlesse the given number be a right Square or cubicall number.

A Declaration of the Tables of Longitude and Latitude of Places following.

The Tables hereafter following, shewing the Longitude and Latitude of places, viz. of Kingdomes, Provinces, Cities, Isles

Iſles, Capes, Bayes, Rivers, and Mountaines, eſpecially the moſt principall of them in ỳ whole World, are gathered from the latest Deſcriptions, Maps and Charts, as well Univerſal as particular: who albeit they differ greatly in Longitude, yet in Latitude moſt of them agrée: and alſo having a reſpect to the beginning of each of their ſeverall Longitudes, they come all to a nére agrément: For ſome beginning their Longitude at the Weſtermoſt part of Africa, makes the Longitude of London to be about 10 degrées 20 minutes: Others beginning at the Canary Ilands makes the Longitude of London 18 degr.: Others more Weſtward make 19 degrées 30 minutes. And Jodocus Hondius beginning the Meridian at ỳ Ile Pico, one of the Azores, makes London to be in Longitude 27 deg. 40 min. but I following Mr. Emery Mulineux, according to his great Globes, doe account the Longitude from the Weſtermoſt parts of S. Michaels, another Ile of the Azores, the midſt of which Ile is 50 minutes in Longitude, and from the Weſtermoſt part thereof the Longitude of London is 25 deg. 40 min. which in effect is not much different from any of the others: Note, that the Longitude is counted from ỳ Meridian paſſing over the aforeſaid place Eaſterwards into a continuall progreſſion, to the end of 360, which is the whole Circumference of the World. Latitude is counted from the Equinoctiall to the end of 90 Degrées on each ſide thereof: and where the Letter S. is after any number, it ſhewes the place to have ſo many degrées and minutes of South Latitude: all the reſt having no Letter adjoyning, have North Latitude: the whole being ſet in Alphabeticall order for the readier finding of any place therein contained: And where the Longitude and Latitude of any Kingdome is ſet down, noted with this ſyllable Reg. it expreſſeth the middle thereof. Further, at the end of ſuch Places as begin with one Letter, is left a ſpace wherein the Traveller may inſert ſuch places, whereof the Longitude and Latitude is to him knowne, and not herein expreſſed.

A Table

A Table of the Longitude and Latitude of all the Notable places of the World, newly Corrected and inlarged by Mr. *T. Stevens* Globe-maker.

A	Longit.		Latit.		
Acupulco	265	0	19	0	
Acartitan Il	329	1	52	1	
Azores an Iland	357	1	39	1	
Achaguas	101	30	5	30	S
Ashin	132	30	34	40	
Aden	81	12	50	1	S
Adia	50	11	25	1	
Adu	105	41	5	41	S
Ægypt	64	3	30	1	
Africa Reg.	40	1	10	1	
Agonata	162	21	38	1	
Agragam	144	29	8	21	S
Aguada segura	253	29	24	1	
Aqua la de pozos	245	20	28	0	
Alina a Mountain	98	41	54	20	
Alacranes	283	5	22	1	
Alagoa	58	41	29	41	S
Albion nova	235	1	50	0	
Albiron	109	29	25	29	
Alboram	25	29	35	29	
Aibrough	16	25	52	20	
Aleno	72	29	38	1	
Alcada	23	4	10	29	
Alexandria	65	1	31	21	
Alexandria	7	11	36	21	
Algaziu	16	0	9	1	
Algiero	33	1	35	21	
Algueseet	63	41	26	51	
Alicante	23	41	39	1	
Alicoa	76	30	13	31	S
Alicut	44	21	38	29	
Alima	108	51	31	1	

A	Longit.		Latit.		
Alleluja	70	21	10	1	
Almedina	54	1	33	41	
Alpes a Mountain	41	29	47	29	
Alliguhas	147	11	38	41	
Amazen	45	29	12	41	
Amazons Reg.	323	1	15	1	
Las Amazona	312	29	12	29	S
Ammon	59	41	27	11	
Amßerdam	33	1	51	29	
Averie a mount	115	0	54	9	
Ancona	63	11	1	11	
Ancona	43	29	43	51	
Amboina	161	54	3	20	
Abona	164	30	6	10	S
Amiona	75	20	1	40	S
Anderhopoly	58	11	44	41	
St. Andre	170	29	12	1	
St. Andre	22	11	56	21	
St. Andreas	62	11	61	11	S
Las Anegadas	296	0	50	1	
Angier	24	41	47	35	
Angleſey	19	51	54	0	
Anglia Reg.	23	0	53	0	
Angoleſme	27	1	46	0	
Antiochia	300	5	6	40	
Antipara	74	2	25	20	S
Antwerpen	31	20	50	30	
Arabia Fœlix	83	0	21	0	
Arabia Deſart	77	0	30	0	
Argier	32	50	35	40	
Armenia Reg.	76	0	41	0	
Arnalus mount	35	0	13	30	S
Aſcention	313	20	18	50	S

A B	Longi		Latit		
La Aſcenſion	15	30	8	0	S
Aſſyria Reg.	85	0	36	0	
Athens	56	10	40	0	
Avero	17	30	41	10	
Auguſtine	293	0	29	50	
Ausburgh	38	40	48	30	
Azur a Mountain	59	0	22	40	
Amiens	28	30	49	40	
B					
BAntam	140	0	5	40	S
Babylon	82	20	33	0	
Babel mandel	80	0	12	50	
Bachu	88	50	42	0	
Bactrina Reg.	115	0	38	30	
Bagaſus a Lake	77	10	50	40	
Bahara an Ile bays	87	20	27	30	
Bay Anegada	319	50	40	20	S
Bay de baxos ane-	321	30	39	50	S
Bianza (gados	149	25	3	0	S
Batavia	123	0	3	20	S
Bay a Dalagoa	56	10	32	10	S
Bay de Fumos	240	20	36	0	
Bay de S. Migell	39	30	8	40	
Bay Oeſinora	312	30	41	0	
Bay de Pinos	233	0	40	30	
Bay Iangos	18	0	37	30	
Bacalaio	335	4	48	28	
Bayona	17	20	42	10	
Bayone	25	30	44	0	
Balſera	82	4	31	10	
Bamberg	39	15	50	10	
Bandu	173	30	33	0	
Bax de los pergos	345	30	20	0	S
Barbades	328	20	12	40	
La Barbada	192	50	1	50	S
Barlingas	16	20	39	30	
Barnagoſſos Reg.	70	0	13	0	
St. Barthoime	194	30	14	0	

B	Longi		Latit		
Bermoudes	316	10	32	30	
Baſel	37	10	47	50	
Beciaſa	65	0	10	30	
Beil	76	15	37	10	
Belef	69	0	51	40	
Beliſſe	21	30	47	0	
Belt	52	40	50	0	
Bengala Reg.	126	0	26	30	
Benichao	136	0	3	50	
Benin Reg.	41	0	7	40	
Bepirus a mount	143	0	34	0	
Bepirus a River	138	20	34	0	
Berga	40	10	62	50	
Bergen	30	30	60	50	
Barwick	22	50	55	50	
Bethel	138	50	25	40	
Baiſer Reg.	50	10	4	0	
Braligrod	58	20	47	30	
Bilbao	23	30	43	0	
Blaskey	12	0	51	40	
Blaves	31	10	42	0	
Blavet	21	15	47	50	
Bloe	5	30	67	0	
Borneo	145	30	3	10	
Bormtholin	40	50	55	30	
Bovenberghen	34	20	56	30	
Brandenbergh	42	30	52	50	
Braſil	5	10	51	20	
Braſilia Reg.	345	0	10	0	S
Braya	74	30	0	30	
Breſt	20	0	48	30	
Bruage	25	30	45	50	
Bruges	29	0	47	30	
Buda	48	0	47	20	
Burdiaux	26	0	45	10	
Briſtow	22	50	51	35	
Brachipult point in Wales	21	25	53	0	

B C	Longi		Latit		
Bachapto	31	0	59	50	
Bruſſels	30	50	51	0	
Barcelona	28	15	41	10	
Burlings	16	0	39	38	
C					
Capes					
CapeS.Francis	335	0	48	5	
Cap Raſo	334	40	46	28	
Cap Maſſiſaco	24	0	43	32	
Cap de las penes	21	0	43	35	
Cap de Alnide	346	50	1	0	S
Cap de Amber	83	30	12	0	S
Cap de St. Anton.	289	51	22	50	
Cap cicete	14	10	51	9	
Cap de S. Antoni	74	30	17	0	S
Cap de St. Auguſt	162	0	6	30	
Cap de St. Auguſt	358	0	8	30	S
Cap baxo	324	0	4	20	
Cap de las baxas	19	41	15	29	
Cap Belford	320	1	65	29	
Cap blanco	273	19	25	21	S
Cap blanco	281	19	10	29	
Cap blanco	331	21	4	26	
Cap blanco	334	21	52	1	
Cap blanco	289	41	2	21	S
Cap blanco	151	1	22	41	
Cap brava	275	1	27	29	
Cap de Breton	332	1	45	41	
Cap cameron	287	21	25	41	
Cap comerin	115	15	7	30	
Cap cantin	17	1	32	11	
Cap de St. Kather.	41	1	1	1	S
Cap Cod	317	0	41	0	
Cap de oro	31	29	42	11	
Cap de croce	65	21	48	21	
Cap Deſierto	281	21	29	21	
Cap Deſperance	324	29	51	1	
Cap St. Domingo	153	21	46	41	S

C	Longi		Latit		
Cap falſo	49	31	34	40	S
Cap feare	305	11	32	29	
Cap fœlix	84	29	14	11	
Cap finiſterre	16	1	43	41	
Cap Florida	293	21	25	29	
Cap Formoſo	28	1	5	1	
Cap Froward	302	39	53	21	
Cap de gato	26	39	36	51	S
Cap de St. Helena	326	11	36	11	S
Cap de ſantiago	309	1	37	29	
Cap St. Iohn	62	29	67	29	
Cap de Krin	13	1	53	41	
Cap de St. Maria	77	29	24	1	S
Cap de Maio	82	52	15	51	S
Cap de St. Maria	327	11	35	11	S
Cap de St. Maria	9	41	21	41	
Cap de la Mola	36	51	6	29	
Cap de nombre de Jeſus	308	11	53	1	S
Cap Ortegall	18	29	44	11	
Cap de palmas	348	11	1	19	
Cap de St. Paul	32	0	5	50	
Cap de peſcadores	277	40	28	0	
Cap del plate	352	50	5	0	S
Cap primero	42	30	2	20	S
Cap de 3 points	28	30	5	0	
Cap de puntas	315	20	10	40	
Cap Daduillius	42	1	34	30	
Cap de Razo	334	30	46	20	
Cap ſalida	74	0	26	10	S
Cap de ſpigiel	353	20	7	20	S
Cap de Navola	12	20	54	0	
Cap tortiga	11	30	18	20	
Cap la vela	305	10	12	30	
Cap S. Vincent	302	30	53	40	S
Cap de Virgin Ma	308	0	53	10	S
Cap de Victoria	297	30	52	0	S
Cap paſſaro	46	29	36	51	

C	Longi		Latit		
Cap Resalgate	96	21	22	21	
Cap raso	317	40	8	0	
Cap roxent	16	29	3	50	
Cap roxo	11	1	22	0	
Cap of good hope	50	30	35	40	S
Cap del spirito san	161	11	13	11	
Cap S. Vincent	17	0	37	0	
Cap Verd	9	51	14	20	
Cap de bona vesta	334	21	49	11	
Cap Walsingham	321	1	63	41	
Campon Reg.	136	1	47	0	
Cairo	67	29	30	0	
Calamita	67	41	48	1	
Caldy	20	1	50	40	
Calecut	112	41	10	29	
Calice in France	29	10	50	42	
Calibia Reg.	42	10	36	20	
California	245	0	30	0	
Camanor	300	20	16	30	S
Cambaba	110	0	8	10	S
Cambaya	110	0	22	0	
Camboya Reg.	142	20	11	40	
Capiapa	304	50	34	0	S
Casma a River	121	40	61	0	
Castrum Portugal	57	10	20	20	S
Casan	86	20	56	30	
Chaga	56	0	6	20	S
Chialo	56	20	7	0	S
Chilimazata	294	30	6	30	S
Chio	58	30	40	30	
Chiguisamba	305	30	17	0	S
Ceala	65	10	21	30	
Coile	48	20	3	10	S
Cora	85	10	19	20	
Coronades	296	30	45	0	S
Corpo santo	84	10	7	30	S
Cumana	313	30	7	0	
Cuson Reg.	297	20	15	30	S

C	Longi		Latit		
Cales in Spaine	20	51	36	10	
Cambala	161	11	51	40	
Canada	305	11	50	21	
Canaria Grand	9	40	27	50	
Canda	59	29	35	21	
Caribes	316	11	7	0	
Cartagena	300	1	20	11	
Cartagena	28	21	38	20	
Cartago	299	29	3	11	
Casena Reg.	38	21	17	11	
Casser Reg	132	21	47	1	
Catajo Reg.	150	1	53	1	
Carnes	22	9	58	29	
Carwick	41	11	69	11	
Chester in England	21	29	53	51	
Chichester	24	11	51	0	
Chidlies cape	326	41	67	29	S
Chily Reg.	305	0	30	1	
Chirman Reg.	96	0	26	29	
Cirena	53	29	32	0	
Cypres	68	4	37	30	
Clearemont	30	55	45	51	
Cocas a Mountain	79	0	47	29	S
Cochin	114	0	9	14	
Call.o Reg.	310	0	16	0	
Colmogory	62	41	63	41	
Colne	34	0	51	41	
Commania Reg.	86	0	51	0	
Congu	147	21	49	11	
Coninxbergh	49	11	55	29	
Constantinople	61	1	44	40	
Copen-hage	38	29	55	51	
Corasan Reg.	108	1	37	0	
Cork in Ireland	15	41	51	41	
Corfu an Jland	22	0	39	19	
Corinth	54	21	39	0	
Corsica	38	11	42	0	
Coxam Reg.	230	0	51	0	

C D E	Longi		Latit	
Cracow	48	29	50	41
Cuba	196	0	31	21
Earle of Cumberlands Iles	316	0	63	0
Cusitan Reg.	87	0	32	0
Conough	15	35	53	45
Cambridge	25	50	52	14
D				
DAngali Reg.	78	0	11	0
Diu	107	3	20	42
Damon	108	8	19	20
Dabol	109	6	17	45
Dawina	74	30	62	10
Dager Oort	48	41	59	41
Dolacia	77	0	14	21
Damascus	74	29	35	0
Danzick	46	0	55	0
L. Darcies Isle	327	51	68	21
Derwinda	47	51	57	26
Deventer	33	25	51	52
Diep	28	41	49	29
Dires Cape	321	29	64	51
Dominica	319	41	14	0
Don a River	75	0	53	21
Dowcex a River	71	0	51	0
Dorow	58	0	51	29
Dover	28	11	51	0
Dublin	16	41	53	11
Dumaran	150	0	8	41
Duy	34	29	59	21
Duyne	56	29	50	29
Davis Straights	324	1	64	0
Darby	24	5	52	55
Dunkirk	29	10	51	12
E				
EBaida	60	1	25	29
Edinborough	22	1	55	51

E F	Longi		Latit	
Ely	25	20	52	40
Elior	26	20	10	10
Queen Elizabeths Foreland	337	0	61	30
Embden	34	10	53	10
Ens	43	0	48	30
Ens	74	10	37	30
Ephesus	60	30	39	40
Ergas	86	0	38	0
Euboya	56	13	41	0
Euphrates a River	76	40	40	0
Europa Reg.	55	0	31	0
Exeter	22	10	51	5
Enchuisen	31	40	52	54
F				
FAlsterhood	40	0	56	0
Famagosta	69	20	37	30
Farrollones	294	20	11	40 S
Fargana	114	40	46	0
Farre	16	20	61	30
Cape Fatache	86	50	15	40
Faso	75	50	45	40
Farnasa	38	10	30	10
Farnandobuck	351	40	9	30
Fees Reg.	21	50	33	50
Fierro	6	20	26	30
Finmarke	47	0	69	30
Flambrough head	25	29	54	0
Flensburgh	36	40	55	0
Fleccory	32	0	58	0
Fly	32	0	53	33
Florence	41	10	43	40
Flores Iland	353	40	39	20
Florida Reg.	292	0	31	0
Floeen	38	40	66	30
La Formanos	310	30	40	40
Formentera	31	10	38	50

F G	Longi		Latit		
Forteventura	11	0	28	0	
Foyle	15	50	55	30	
Frales	314	30	11	20	
Franckfurt	36	30	50	0	
Friſland	351	30	62	0	
Frobiſhers ſtrait	331	20	64	0	
A furious Overfal	322	30	60	0	
Farre Ilands	17	0	62	10	
Farhill Ile	24	45	60	0	
Ferando	164	0	32	35	
G					
GAgo Reg.	25	0	8	30	
Galathia	37	20	37	0	
Gambra a River	12	0	13	10	
Gaunt	30	20	50	40	
Garamantica	51	30	16	0	
Garneſey	22	20	49	40	
Gaza	70	50	33	10	
Gamba	64	40	17	30	S
Gargiza	62	40	12	0	S
Gemenecota	118	40	6	0	
Geneva	33	40	46	20	
Genua	37	50	45	0	
Genua	15	20	16	0	
Gerguth Reg.	153	0	17	0	
Germanarco	40	0	51	0	
Geſſelvin	24	30	32	20	
Gomera	7	30	27	0	
Ghir a River	25	30	22	0	
Giamber	18	1	33	41	
Gilberts ſound	326	51	67	1	
Giras a River	41	21	20	11	
Galloway	15	49	53	15	
Goa	102	21	15	14	
Glaſcow	29	0	57	0	
Golfo de Bengala	125	0	15	0	
Golfo de S. Helen	48	41	33	20	S

G H	Longi		Latit		
Golfo de la India	44	21	3	14	S
Golfo delos negro	350	30	2	0	S
Golfo del Rey	40	40	5	30	
Golfo de todos Santos	345	30	1	41	S
Golfo de S. Anton	46	20	26	0	S
Golfo frio	45	32	20	0	S
Goteland	45	21	57	30	
Gozo	58	20	34	41	
Granada	318	20	11	0	
Granata	23	30	38	0	
Grecia Reg.	54	0	40	0	
Gratioſa	357	30	39	2	
Groninghen	32	11	53	0	
Groenland	345	0	75	0	
Groy	21	0	47	21	
Guinea nova	180	0	5	0	S
Guinea Reg.	18	0	9	0	
Gunogona	67	30	6	0	
Gibraltar ſtraight	21	30	36	0	
Greenland	50	0	77	0	
H					
HAles Iland	337	30	63	0	
Haliber	78	41	30	0	
Halicz	52	51	48	41	
Hambrough	37	11	53	21	
Hartlepoole	24	0	55	21	
Harwich	27	29	52	0	
Havana	292	11	23	0	
Hebrides	15	20	58	0	
Heydelbergh	36	0	49	0	
Heiſt	23	29	46	29	
Heiſhant	19	29	48	41	
Heptapolis	324	29	25	21	
Hercules Pillers	69	21	32	11	
Hellielaland	33	51	66	10	
Hercania Reg.	190	0	40	0	

H J	Longi		Latit		
Hiſpania Reg.	25	0	40	0	
Nova Hiſpania	280	0	13	29	
Hiſpaniola	306	0	18	29	
Holindall	36	11	61	1	
Honts Oort	48	30	59	1	
Horne	12	10	66	10	
Hull	25	21	53	41	
Hungaria	50	0	48	1	
Hidaſpes a River	124	0	33	21	
Hipaſis a river	124	0	33	1	
Helin-head	15	0	55	15	
Hereford	22	38	52	12	
Heel of Danthick	46	10	55	40	
I					
IAmbie	121	30	1	15	S
IJacatra	140	0	6	0	S
Iamaica	298	30	17	0	
Iaſques in Perſia	94	0	25	40	
Japan	169	0	38	0	
Ierſey Iland	23	0	49	20	
Iava major	140	0	9	0	S
Iava minor	151	0	8	0	S
Iazin	77	30	20	30	
Iapara	141	20	7	40	S
Ierico	73	1	33	0	
Ieruſalem	72	21	33	0	
Ilmens a River	105	0	17	0	
Imaus a mountain	128	0	39	0	
India Orientall	135	0	26	0	
Indus a river	115	29	26	0	
Inſpurg Ilands	40	41	47	50	
The three Ilands	169	21	40	2	S
Ile de Avis	310	30	11	30	
Ile de Avis	173	50	4	30	
Ile de baſtinado	293	30	10	30	
Ile Brava	9	20	14	20	
Iſles de coroles	194	40	9	50	

I	Longi		Latit		
Ile Deſierto	178	0	21	1	
Ile del Fuego	1	30	14	21	
Ile de los fuegos	182	29	27	40	
Ile de los Galopegos majores	281	10	4	0	
Ile de los Galopegos minores	277	30	1	10	
Ile de Hombres blancos	169	20	5	41	S
Ile de St. Iago	158	20	8	0	
Ile de St Ivan	164	30	6	0	
Ile de los Ladrones	177	21	15	11	
Ile de los Lobos	307	41	40	21	S
Ile de St. Maria	296	29	37	2	
Ile de Martin vaz	11	21	21	1	S
Ile de Mayo	4	29	15	29	
Ile St. Michael	0	0	38	25	
Ile de Negros	155	29	10	29	S
Jland of Fowles	334	0	50	0	
Ile de Orleance	312	0	50	29	
Ile de Pajaros	314	0	12	41	
Ile de palmas	163	21	6	0	
Ile de Paxaros	198	51	8	51	
Ile de paxaros	234	21	28	20	
Ile de Pearles	293	10	7	0	
Ile de Pinos	292	21	21	29	
Ile de Rees	162	0	25	20	
Ile of Salt	5	0	16	29	
Salomon Jland	204	40	10	0	S
Ile Solis	347	0	10	29	
Ile St. Thomas	38	0	0	0	
Ile St. Thomas	251	0	20	11	
Ile de Verde	353	51	45	29	
Ile de St. Vincent	175	50	8	0	
Ile de S. Vincent	73	21	20	29	S
Ile de St. Catalina	334	10	27	30	S
Ile de S. Cedros	240	30	29	50	S

J K L.	Longi		Latit		
Ile de Fernan lare	354	20	2	20	S
Ile de Lima	259	10	22	0	S
Ile Secas	46	20	19	30	S
Ile de Triſtan de Acunia	26	30	36	0	S
Joam	135	0	7	29	
Ioloſo	24	29	6	0	
Ipſwich	27	12	52	22	
Ioppe	71	21	34	0	
Iſebella	325	21	18	51	
Ireland	8	0	66	0	
Italy Reg.	42	29	43	0	
Ireland	16	0	53	29	
Iucatan Reg.	283	0	18	0	
Iugor	138	0	7	50	
Iuica	31	21	39	30	
Iulibella	61	0	1	30	
K					
KAlmuchy in Tartaria	95	0	51	0	
Karakithath Reg	119	0	51	0	
Kaſakky Tartaria	103	0	51	0	
Kithais Reg.	110	0	57	0	
Kithay a Lake	123	31	53	0	
Kola	54	51	69	0	
Koſeneg	4	11	65	10	
Koſar a River	96	40	49	0	
Kintaile	19	30	56	45	
Kingſaile	15	3	52	35	
L					
LAcierna	24	50	39	30	
Ladena	53	30	41	31	
Ladoga	62	11	61	40	
Lago de los Coronados	295	0	44	0	S
Lampeſa	36	23	33	0	
Lancerota	11	41	9	30	

L	Longi		Latit		
Lanow	51	11	52	30	
Laredo	22	51	43	0	
Lariſa	70	0	33	0	
Larta	53	0	46	0	
Lake de Goulcme	306	40	48	0	
Lacus Armiſius	131	0	70	10	
Lacus ſaſſus	137	40	47	30	
Leon	21	31	42	35	
Leon	283	41	11	21	
Leopolis	52	51	49	2	
Lepin	98	0	58	41	
Leguio major	165	0	28	0	
Leguio minor	158	41	22	0	
Lerida	28	21	41	30	
Letter point	335	0	62	0	
Lima	296	41	23	30	S
Limonia	72	11	44	20	
Lymoſa	43	29	34	50	
Lyons	32	41	45	40	
Lgorn, or Liorne	40	21	43	30	
Lisbon	17	29	39	11	
Lyzard	18	30	50	10	
London	25	50	51	30	
London coaſt	326	11	72	30	
Lepeſo	74	1	49	41	
Loyre a River	24	14	47	41	
Longſound	34	30	58	55	
Lubeck	38	2	53	11	
Lucka	42	11	52	0	
Lucky	64	0	58	21	
L. *Lumley*, Inlet	320	0	61	0	
Luna a Mountain	60	0	16	0	
Lundy	19	2	51	0	
Lutske	54	0	50	21	
Luſon an Iſland	156	0	17	0	
Lybia	33	0	33	30	
Lin	29	25	52	48	
Lincoln	25	25	53	22	

M	Longi		Latit		
M					
Aboga	62	41	13	30	S
Machian	106	41	0	29	
Machoenta	93	51	33	40	
Macſin Iland	93	30	75	30	
Macyra an Iland	93	0	19	40	
Madera Ilands	8	11	1	29	
Meotis Palus	71	30	39	20	
Magadaxo	78	0	5	11	
Magalo	71	20	9	29	S
Marda	2	40	46	40	
Magelans ſtraits	305	0	53	25	
Majorca Iland	31	31	30	0	
Malibrigo	178	51	26	0	
Malaca	173	0	3	30	
Malaga	23	51	37	21	
Maldivar an Iland	113	0	3	0	
Molorca	32	31	31	0	
Malta an Iland	46	0	35	31	
Man an Iland	19	0	54	51	
Moſambique	70	0	14	32	
Magador	16	20	31	50	
Mamora	155	0	0	30	
Mombaſa	72	0	4	50	S
Mangeſia	61	91	41	29	
Mangichina	150	0	37	0	
Manica	62	51	23	29	S
Manicongo Reg.	46	0	5	0	
Maniola Iland	140	30	3	50	S
Marchant Ile	330	0	68	21	
Mare de Bachuor the Caſpian ſea	92	0	45	0	
Mare congelatum	345	0	64	0	
Mare de India	120	0	10	0	S
Mare major	68	0	46	0	
Mare mediteraniũ	59	0	35	0	
Mare rubrum	75	0	20	0	
Mare vermeio	255	0	26	0	

M	Longi		Latit		
Mar del zur	270	0	15	0	
Margarita	314	11	10	50	
Marigalante	320	0	15	0	
Marmos	306	21	40	40	
Marocco	20	0	30	19	
Marcells	83	51	43	40	
Malalig	23	29	30	20	
Milford haven	20	25	51	48	
Maſtagan	30	1	35	20	
Mazaker	167	0	33	0	
Madagaſcar	77	0	19	5	S
Maræ Apane (tain	312	10	8	0	
Meander a Moun-	152	0	31	30	
Maelſtream	36	0	67	22	
Meb	46	29	54	30	
Medina cœli	23	29	41	10	
Medina talnaby	37	0	27	20	
Manilia	156	0	3	16	
Medino	98	29	36	29	
Middleburg	20	40	52	0	
Meiſſen	41	0	51	10	
Melinde Reg.	71	21	3	20	S
Melley Reg.	15	41	12	0	
Melving	48	1	54	50	
Ments	35	51	50	0	
Meſhet	85	29	52	50	
Meſopotamia	78	1	35	0	
Meſſana	45	51	37	50	
Metz	33	29	49	45	
Mien Reg.	136	1	31	0	
Mienskow	56	41	54	50	
Millaine	38	29	46	10	
Minorea Ile	34	26	40	0	
Moldavia Reg.	55	0	46	0	
Molines	30	21	46	40	
Molucca Iland	160	41	1	0	
Memorancie	130	0	47	0	
Mongul Reg.	160	0	61	30	

M N	Longi		Latit		
Monte de branid	47	11	30	15	S
Mont frogoso	344	0	12	0	S
Mont negro	44	41	17	0	S
Mont Raleigh	320	30	65	0	
Mount royall	301	0	45	40	
Morea Reg.	54	30	38	0	
Mosaich	68	50	55	0	
MosambiqueReg.	70	20	14	40	S
Muscovia Reg.	80	0	59	0	
Moskow	70	0	55	40	
Mossa	84	30	35	0	
Mossull	84	0	34	55	
Mozena	24	20	34	30	
Moa	96	36	21	31	
Minas	165	0	36	20	
Moseneck	69	50	51	30	
Munster	35	0	52	10	
N					
NAbarz	79	50	50	50	
Naiman Reg	140	0	64	0	
Naynen	31	10	50	0	
Nantes	24	10	47	50	
Napoly	45	0	41	0	
Napoly	55	10	38	0	
Napthaly	73	0	34	30	
Narbona	30	20	43	20	
Nardenborg	47	10	67	5	
Narve	56	10	60	0	
Navarre	26	40	41	39	
Naseph	110	30	43	0	
Natoria Reg.	66	0	41	0	
Nazareth	72	40	34	10	
Newcastle	23	10	55	20	
New found Land	334	20	46	30	
Nicaria	59	30	39	30	
Nicober an Iland	130	30	6	40	
Nocomedia	63	30	44	20	
Nicopolis	56	30	45	0	

N O	Longi		Latit		
New England	315	0	43	0	
New Plimouth	315	0	41	37	
New Salem	315	10	42	35	
Nieflot	57	40	59	50	
Nilus a River	67	20	32	0	
Ninus	82	20	37	0	
Nisa	36	10	44	0	
Nissa	45	30	50	30	
Naze in Norway	31	0	58	5	
Noes a Mountain	81	0	40	21	
Nolon	30	0	40	22	
Nombre de dios	294	29	9	22	
Norumbega	315	41	43	41	
Norweigh	35	0	62	2	
Novograde	57	11	53	2	
Nowgrod	65	29	52	41	
Nowgorod	62	51	60	29	
Nowgorod	80	2	55	21	
Nubia Reg.	57	2	13	0	
Nubia a River	57	2	15	41	
Noremberg	39	9	49	29	
Norwich	27	15	52	45	
O					
OBy a River	107	1	55	0	
Ocea a river	77	29	55	41	
Olant	43	29	57	0	
Oleron	24	29	45	29	
Olone	24	29	47	0	
Omagua Reg.	310	0	9	0	
Omba	54	11	66	51	S
Onega a River	56	41	64	0	
Onegaburg	59	29	62	29	
Opawkow	69	10	53	30	
Oreades Iles	22	11	59	2	
Orellana	310	0	5	0	
Orixa Reg.	119	1	19	2	
Orleans	28	29	48	2	
Ormus Isle	91	30	28	40	

O P	Longi		Latit		
Orſa	59	51	54	21	
Orſa	41	21	61	29	
Ottona	44	29	42	40	
Ortonto	49	24	40	21	
Oxenford	24	0	52	0	
Oya Reg.	75	0	13	0	
Oſtend	29	29	51	29	
Orange	30	35	43	35	
Orliance	27	52	47	42	
Old-ſonnd	31	36	51	25	
Orfordnes	28	0	52	15	
P					
PAganza	99	51	45	0	
Paito	290	30	5	10	S
Palagoſa	47	29	43	0	
Palandura Iland	108	0	11	0	
Palatia	60	51	39	21	
Palma Jland	6	21	28	0	
Palona	105	10	2	0	S
Palmer	120	0	41	0	
Pambolona	24	29	42	41	
Panama	394	29	8	11	
Pantanalia	42	50	36	29	
Panuco	270	11	22	20	
Pavia	375	50	46	10	
Patricks purgator	15	55	54	32	
Paris	29	2	48	29	
Parma	39	20	45	11	
Paſſan	41	50	48	41	
Paura	37	51	46	11	
Paznaſu	155	29	45	51	
Pechora	65	51	67	0	
Pechora Caſtle	73	51	64	51	
Pegu	135	0	20	0	
Peim Reg.	132	0	51	29	
Perigo	323	11	43	21	
Pernow	53	29	58	41	
Peru Reg.	296	0	10	0	S

P	Longi		Latit		
Peruſia	42	20	43	11	
Peſcara	34	29	30	11	
Philippina Iland	158	0	15	0	
Palimbam	142	40	7	30	
Pico	356	41	38	21	S
Picora Reg.	317	0	10	2	
Pigmea	148	41	32	2	
Pilingu	144	21	40	2	
Pina	296	21	3	1	
Pinga	101	40	14	20	S
Port de los Leones	318	0	42	30	
Piramides	373	11	20	21	
Piſa	40	29	43	41	
Pizan	73	0	51	29	
Plata	315	0	19	51	
Plimouth	21	11	50	51	
Poosko	48	11	52	41	
Plotsko	57	29	57	41	
Podolia Reg.	59	0	49	29	
Poyctiers	26	29	47	21	
Poldavid	20	5	47	55	
Polonia Reg.	53	1	50	0	
Buen Porta	177	21	2	0	S
Port de Canoas	239	21	36	41	
Port de Cavallos	283	0	14	21	
Port de la Concep	45	40	24	21	S
Port Deſire	313	0	47	41	S
Port Famine	302	51	53	11	S
Port Fremo	44	0	4	0	S
Port Delgado	42	11	3	51	
Port de S. Miguel	240	29	35	2	
Port de Nigrillo	296	51	17	11	
Port a Port	17	30	41	15	
Port Sallido	186	41	3	0	S
Port Santo	10	0	32	29	
Port St. Vincent	337	21	23	51	S
Prague	42	29	50	0	
Preſlaw	49	40	51	11	

PQR	Longi		Latit		
Preſlaw	49	41	49	45	
Portland	22	40	50	40	
Point Comfort	309	10	37	12	
Primsberg	48	30	55	11	
Pruſſia Reg.	50	0	54	6	
Ptolomais	66	41	29	40	
Punto de S. Helen	290	11	2	11	S
Punto de S. Helen	325	21	37	30	S
Punto de S. Lucas	152	29	23	29	
Priaman	118	0	0	20	
Q					
Quanza	157	29	44	10	
Quelenſu	158	29	36	1	
Quianiu	144	41	42	20	
Quiloa Reg.	69	51	8	51	S
Quinza	153	0	40	1	
Quito	293	11	0	1	
Quivira	233	0	42	0	
R					
Aguſy	40	29	44	0	
Ramuſes	68	29	30	30	
Rane	352	41	63	0	
Ravenna	42	21	44	21	
Rhodes	61	41	37	11	
Rianrech	94	41	40	0	
Ribadeo	20	21	43	21	
Richman Ile	317	30	43	34	
Riga	53	30	58	0	
Rems	30	35	49	12	
Rio de Arboledas	329	0	1	41	S
Rio de S. Auguſt	350	0	15	3	S
Rio de S. Barbary	326	41	34	1	S
Rio del Braſil (nes	248	21	17	11	S
Rio de los camero-	42	0	5	25	
Rio de Camorones	315	0	44	29	S
Rio del Campo	42	29	2	51	
Rio de angla	42	30	1	40	
Rio de canno	308	40	33	10	

RS	Longi		Latit		
Rio delce	316	29	52	0	
Rio de S. domingo	353	0	7	51	S
Rio del eſtremo	340	41	22	9	S
Rio de Flores	287	19	29	0	S
Rio del gado	34	21	6	21	
Rio de Gigantes	278	29	29	0	
Rio grande	301	11	11	0	
Rio grande	314	29	44	0	
Rio del guata	284	29	29	29	
Rio de labecha	304	15	10	41	
Rio de S. Helena	348	41	10	29	S
S. Laurence River	318	51	53	0	
Rio de Manicongo	48	21	10	0	S
Rio del Oro	10	21	22	29	
Rio de Palmas	272	11	14	21	
Rio Panuco	271	51	22	29	
Rio de pera	292	29	29	0	
Rio de la Plata	326	29	36	0	S
Rio primero	327	41	55	0	
Rio Sancto	300	29	3	0	S
Rio de Spirito ſan	281	29	31	0	
The white River	308	11	51	21	S
Rypon	35	29	55	21	
Roan	27	41	48	51	
Rochel	25	29	46	41	
Romney	42	29	42	0	
Rooſewick	40	21	54	0	
Roſtow	72	11	57	0	
Ruſſia	57	29	59	29	
Rye	27	29	51	1	
Rio de Senega	14	25	15	6	
S					
Sabarſa	154	51	45	0	
Sablellan Reg.	114	0	34	0	
Sabron	84	51	45	11	
Saffee	16	10	32	10	
Saendbar	174	41	35	51	

S	Longi		Latit		
Sagatin	95	29	58	21	
Sala	89	41	48	0	
Salamanca	20	29	40	51	
Salatta	72	41	41	51	
Salina	45	0	38	29	
Salley	20	10	33	30	
St. Sebaſtan	24	25	43	15	
Salsburg	42	0	48	21	
Salſtom	32	21	62	0	
Salvado	321	21	5	0	
Samaria	72	12	33	40	
Sanderſons Tower	320	0	65	29	
Hope Sanderſon	326	21	72	41	
Sandry	162	51	53	0	
Sanſon	20	41	43	21	
St. Crux	334	21	43	29	
St. Chriſtophers	319	10	17	0	
St. Davids	20	0	52	0	
St. Domingo	307	11	17	51	
St. George	357	11	39	0	
St. Helena	24	30	16	0	S
Santiago	264	29	20	29	
Santiago	298	11	32	11	
S. Iago	175	29	2	0	S
S. John de Luz	25	11	43	21	
S. Lazaro	71	0	11	21	S
S. Lucar	21	21	37	11	
S. Lucia	1	1	17	0	
S. Malo	24	21	48	50	
S. Maria	8	29	17	0	S
S. Maria	240	41	34	21	
S. Maria	0	19	56	0	
S. Maries	85	1	44	29	
S. Maries of Naza.	66	30	16	29	
S. Martha	301	21	10	41	
S. Martin	321	11	51	0	
S. Martins Ilands	293	10	46	51	S
S. Mathewes	21	11	1	51	S

S	Longi		Latit		
S. Michael	60	50	65	29	
S. Michael	0	0	38	5	
S. Miguel	327	21	47	21	
S. Miguel	291	41	9	11	S
S. Miguel	268	0	24	0	
S. Miguel	249	0	32	51	
S. Nicolas	69	0	14	0	
S. Nicolas	323	21	53	41	
S. Nicolas	2	2	17	0	
S. Petro	64	29	1	29	
S. Pol de Lyon	20	41	48	48	
S. Sampſon	306	29	40	29	
S. Vincent	0	29	17	29	
S. Vincent	318	41	11	51	
Sapom Iland	167	11	0	29	
Sarachi	84	29	44	11	
Saragoſa	26	11	41	51	
Sardinia	39	0	40	0	
Satyrorum Iland	174	11	46	30	
Satavapoly	75	29	47	21	
Scarborough	24	51	54	51	
Shotland	25	0	60	0	
Scotland Reg.	20	0	57	0	
Segedin	49	0	47	11	
Seames	19	29	48	21	
Senega Reg.	13	0	24	0	
Serneti Reg.	106	29	33	29	
Saboliſher	83	41	56	20	
Shahaskik	91	29	53	9	
Shrewsbury	22	35	52	55	
Sierraleona	15	30	7	40	
Skalholt	8	30	65	20	
Sibier Reg.	99	20	59	30	
Sicilia	45	0	37	30	
Sidon	72	10	36	30	
Siam	140	0	13	40	
Sinai Mountaine	27	0	30	0	
Sinus Mexico	280	0	26	0	

S T	Longi		Latit		
Sinus Perſia	85	0	29	6	
Sion	59	10	12	40	
Sipanto	45	30	41	50	
Sivill	18	6	37	45	
Slaba	55	50	58	41	
Slavonia	47	0	45	0	
Slego in Ireland	15	35	54	15	
Slowoda	68	20	64	30	
Slowoda	80	30	58	51	
Smirna	66	21	40	29	
Snavill	2	30	64	21	
Sorlings	18	0	50	0	
Spacado	46	50	45	21	
Spier	35	30	49	21	
Spina	60	50	43	29	
Stad	30	40	61	41	
Staphold	2	20	65	41	
Stetin	42	10	53	51	
Stoby	52	30	44	0	
Stocholme	42	0	58	11	
Straights of Matuchin	74	30	73	11	
Swedia Reg.	40	0	60	0	
Sumatra an Iland	134	0	0	0	
Sohar	92	23	23	5	
Surrat	109	50	20	7	
Swally Road	109	31	21	20	
Saldania Bay	49	40	33	40	S
Silly	18	0	50	2	
Stert	22	50	50	40	
Swinburne-head	25	30	59	51	
Syria	74	0	39	0	
Siracuſa	44	41	37	0	
Southampton	24	5	51	11	

T	Longi		Latit		
TArante	48	0	40	29	
Tarapaca	306	21	30	41	
Tarbacan	109	29	34	51	
Targa Reg.	32	0	25	0	
Taragona	29	29	40	41	
Tarſo	71	21	40	0	
Tarter	152	0	63	21	
Tartaria Reg.	130	0	62	0	
Tasken Reg.	129	0	49	0	
Tatracan	55	0	44	51	
Tecou	116	29	0	41	S
Teneriffe	8	11	27	29	
Tendua Reg.	170	0	59	0	
Teneſab	46	41	61	11	
Tarcera	358	23	39	0	
Terra alta	160	29	6	51	S
Terra alta	45	21	15	21	
Ter de los ſumos	322	29	40	21	S
Tharſis	115	21	49	0	
Theſſalonia	53	44	44	21	
Texell in Holland	31	0	53	15	
Thouloufe	28	40	43	50	
Thunnis	67	40	32	0	
Tygris a River	84	0	34	30	
Tocrors	54	50	46	0	
Togora	146	0	49	50	
Tolledo	22	20	39	40	
Tollon	34	5	43	20	
Toul	33	10	40	10	
Toures	27	30	47	50	
Trent	40	10	46	10	
Triago an Jland	278	40	21	0	
Tribanta	63	30	41	50	
Trinidad	355	20	19	10	S
Trinidad	295	50	21	20	
Trinidad	319	20	9	0	
Trinity harbour	308	30	36	0	
Tripolis antiqua	44	21	30	20	
Tripolis in Barbar	45	21	30	30	
Tripolis ſoria	72	21	37	0	

T V	Longi		Latit		
Troia	59	0	42	30	
Troy	31	0	48	10	
Tuna	41	51	64	30	
Turſon	131	30	56	30	
Tyrus	71	35	35	30	
Tzercas	79	50	49	20	
Talao	159	0	3	30	
Ternato	160	50	0	55	
Tidore	160	50	0	50	
Timor	139	12	10	20	S
Tunis	40	0	36	0	
V					
VAlentia	29	20	39	41	
Varcano	107	50	39	0	
Varon	83	30	70	30	
Voygats an Iland	81	30	69	21	
Venice	41	40	45	51	
Verma Reg.	133	0	21	30	
Varona	40	40	45	50	
Viana	17	30	42	0	
Viatea	87	50	59	30	
Vienna	45	30	48	30	
Ville longa	28	20	7	40	
Ville conde	17	30	41	30	
Virginia	302	1	36	0	
Viſhgrod	16	30	51	30	
Bona Viſta	4	30	15	30	
Buena Viſta	308	4	40	11	
Buena Viſta	177	30	13	30	
Ulm	37	50	48	50	
Volga a River	75	40	58	0	
Vpſalia	42	50	60	0	
Vigis a River	85	50	53	20	
Viſting	70	30	61	30	
W					
WAersberghen	30	1	57	20	

W X Y Z	Longi		Latit		
Wardhouſe	50	30	70	26	
Earle *Warwicks* foreland	323	11	62	1	
Waterford	17	15	52	16	
Count *Warwicks* Sound	330	41	64	41	
Wakefield	23	48	53	45	
Waſilgo Road	81	50	56	41	
Waxon	49	20	52	29	
Weymouth	23	50	51	0	
Welichy	96	30	56	0	
Wiſhkipoyaſſa	101	20	63	29	
Wolifz	63	40	56	51	
Weroy	39	50	68	41	
Weſell	31	29	51	29	
Weſterhould	40	29	67	41	
Whitbay	24	26	55	0	
Whitſon-head	316	5	41	45	
Wiborough	56	29	62	35	
White Iſle	25	11	50	29	
Sir *Hugh Willobies* Iland	60	0	72	0	
Winterton	27	20	53	29	
Wologda	73	50	9	29	
Wologda	74	30	60	0	
X					
XAques	282	20	20	29	
Y					
YArmouth	27	30	53	0	
Yorke	23	30	54	29	
Yuaga	303	30	21	0	
Yuch cope	22	56	56	20	
Z					
ZAcana a river	6	13	40	0	
Zacatula	269	20	40	0	S
Zacotan an Iland	88	12	0	51	

Z	Longi		Latit		
Zama	49	30	14	0	S
Zama	74	41	11	41	
Zante	52	0	38	0	
Zeilam	104	0	8	0	
Zanhage Reg.	20	0	24	0	S
Zanziber	37	52	5	29	
Zara	46	25	43	41	
Zaradrus a River	126	0	94	0	

Z	Longi		Latit		
Zavan	41	29	51	0	
Zedica	43	0	29	29	
Zegzeg Reg.	36	41	14	41	
Zova Zembla	83	29	74	0	
Zinguis	76	11	49	29	
Zoidalanell	137	31	53	51	S
Zuenziga Reg.	25	0	56	0	

The Table of the North-Starre, as it was formerly Calculated by the Author *J. Tap.*

If the Guards be —	Points of the Compasse.	Then the Load-starre is	Degrees	Minutes	Of Declination
	N w. by W.		0	0	Vnder the Pole.
	Northwest.		0	34	
	N w. by N.		1	6	
	N. N w.		1	36	
	N. by W.		2	4	
	North.		2	24	
	N. by E.		2	40	
	N. N E.		2	50	
	N E. by N.		2	52	
	Northeast.		2	50	
	N E. by E.		2	40	
	E. N E.		2	24	
	E. by N.		2	4	
	East.		1	37	
	E. by S.		1	6	
	E. S E.		0	34	

If the Guards be —	Points of the Compasse.	Then the Load-starre is	Degrees	Minutes	Of Declination
	S E. by E.		0	0	Above the Pole.
	Southeast.		0	34	
	S E. by S.		1	6	
	S. S E.		1	36	
	S. by E.		2	4	
	South.		2	24	
	S. by W.		2	40	
	S. S W.		2	50	
	S W. by S.		2	52	
	Southwest.		2	50	
	S W. by W.		2	40	
	W. S W.		2	24	
	W. by S.		2	4	
	West.		1	36	
	W. by N.		1	6	
	W. N W.		0	34	

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